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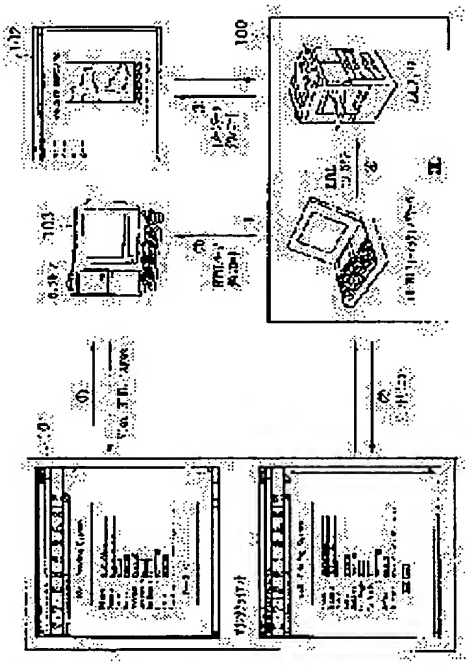
(54) PRINTER SYSTEM

(57)Abstract:
PROBLEM TO BE SOLVED: To make a printer system print an XML document as it is.
SOLUTION: By designating the URL of the document from a print client 101 to an XML printer 100b, the HTML document provided by a document server 103 is read out. The XML printer 100b transforms that document into an SVG form by a formatting server 100a, interprets that document, downloads an image if needed, and prints the document while integrating that image therein.



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CLAIMS

[Claim(s)]
[Claim 1] If it is the printer system connected to the network and printing directions data are received An acquisition means to gain document data from the specified place when it is place data which specified the place on the network of document data, The printer system characterized by having an interpretation means to interpret the document data gained by the aforementioned acquisition means, and a printing means to carry out a rendering based on the document data interpreted by the aforementioned interpretation means, and to print.
[Claim 2] The aforementioned interpretation means is a printer system according to claim 1 characterized by interpreting the document data when it has further a distinction means to distinguish whether it is place data with which it specified the place on the network of document data when printing directions data are received, or it is document data and printing directions data are document data.
[Claim 3] It is the printer system according to claim 1 which as for the aforementioned document data format is unfixed document data, and the aforementioned interpretation means has a conversion means to change into form that the aforementioned document data can be interpreted, and is characterized by this conversion means deciding the format at the time of printing with reference to format information at the time of conversion of document data.
[Claim 4] The aforementioned conversion means is a printer system according to claim 3 characterized by deciding the format of the aforementioned document data according to the style sheet which defined the format of document data beforehand.
[Claim 5] The aforementioned interpretation means is a printer system given in the claim 1 characterized by gaining the specified object based on specification of the object concerned, and embedding in the appointed place of the aforementioned document data, or any 1 term of 4, when specification of the object which should be embedded to the aforementioned document data is found out.
[Claim 6] The aforementioned interpretation means is the printer system according to claim 5 which embeds the object to the aforementioned document data, and will be characterized by to gain an object with reference to the specified position if not stored if stored there first with reference to the aforementioned cache means in case the object which has a cache means store the gained object and was specified based on specification of the aforementioned object is gained.
[Claim 7] The printer system according to claim 1 characterized by having further a decode means to decode coded data.
[Claim 8] The aforementioned printing means is a printer system according to claim 1 characterized by having further a color matching means to adjust the color of the aforementioned document data, and the color information outputted by the aforementioned color printing function in order to have a color printing function and to carry out color printing by this color printing function.
[Claim 9] In the printer system connected to the network, if printing directions data are received The acquisition process which gains document data from the specified place when it is place data which specified the place on the network of document data, The control method of the printer system characterized by having the interpretation process which interprets the document data gained according to the aforementioned acquisition process, and the printed presswork which carries out a rendering based on the document data interpreted according to the aforementioned interpretation process.
[Claim 10] The aforementioned interpretation process is the control method of the printer system according to claim 9 characterized by interpreting the document data when it has further the distinction process which distinguishes whether it is place data with which it specified the place on the network of document data when printing directions data are received, or it is document data and printing directions data are document data.
[Claim 11] It is the control method of the printer system according to claim 10 which as for the aforementioned document data format is unfixed document data, and the aforementioned interpretation process has the conversion process changed into form that the aforementioned document data can be interpreted, and is characterized by this conversion process deciding the format at the time of printing with reference to format information at the time of conversion of document data.
[Claim 12] The aforementioned conversion process is the control method of the printer system according to claim 11 characterized by deciding the format of the aforementioned document data according to the style sheet which defined the format of document data beforehand.
[Claim 13] The aforementioned interpretation process is the control method of a printer system given in the claim 9 characterized by gaining the specified object based on specification of the object concerned, and embedding in the

appointed place of the aforementioned document data, or any 1 term of 12, when specification of the object which should be embedded to the aforementioned document data is found out.
[Claim 14] The aforementioned interpretation process is the control method of the printer system according to claim 13 characterized by to gain an object with reference to the specified position if the gained object is stored in a cache, and are stored there, and the object is embedded to the aforementioned document data and it is not probably stored with reference to the aforementioned cache in case the object specified based on specification of the aforementioned object is gained.
[Claim 15] If it is format conversion equipment connected to the printer which can process the document data described in the predetermined language, and the network and document data are received Format conversion equipment characterized by having a conversion means to change the document data into form that the aforementioned printer can be processed, with reference to the format information specified to the document concerned, and an acquisition means to acquire the functional information on the aforementioned printer on the occasion of conversion by the aforementioned conversion means.
[Claim 16] The aforementioned conversion means is format conversion equipment according to claim 15 characterized by changing the document data of XML or HTML form into the document data of SVG form.
[Claim 17] If it is the printer connected to the format conversion equipment changed into form that document data can be processed, and the network and printing directions data are received An acquisition means to gain document data from the specified place when it is place data which specified the place on the network of document data, The conversion means which transmits the document data gained to the aforementioned format conversion equipment, and is transformed to the form which can be processed, The printer characterized by having an interpretation means to interpret the document data changed by the aforementioned conversion means, and a printing means to carry out a rendering based on the document data interpreted by the aforementioned interpretation means, and to print.
[Claim 18] The aforementioned interpretation means is a printer according to claim 17 characterized by gaining the specified object based on specification of the object concerned, and embedding in the appointed place of the aforementioned document data, when specification of the object which should be embedded to the aforementioned document data is found out.
[Claim 19] The printer system characterized by the bird clapper combining format conversion equipment according to claim 15 or 16 and a printer according to claim 17 or 18.
[Claim 20] If it is a computer-readable storage for storing the computer program for changing the document data described in the predetermined language into the form which can be processed by the printer and the aforementioned computer program receives document data The code of the conversion process which changes the document data into form that the aforementioned printer can be processed, with reference to the format information specified to the document concerned, The computer-readable storage characterized by including the code of the acquisition process which acquires the functional information on the aforementioned printer on the occasion of the conversion in the code of the aforementioned conversion process.
[Claim 21] It is a computer-readable storage for storing the computer program which controls the printer connected to the format conversion equipment changed into form that document data can be processed, and the network. The code of the acquisition process which gains document data from the specified place when the aforementioned computer program receives printing directions data and it is place data which specified the place on the network of document data, The code of the conversion process which transmits the document data gained to the aforementioned format conversion equipment, and is transformed to the form which can be processed, The computer-readable storage characterized by including the code of the interpretation process which interprets the document data changed in code of the aforementioned conversion process, and the code of the presswork which carries out a rendering based on the document data interpreted in code of the aforementioned interpretation process.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] this invention relates to the printer system for printing the document described by the markup language which defines the appearance of a document by specifying the logical structure of objects, such as a character and a picture, especially as it is about the printer system for printing the document data created with the host computer.
[0002]
[Description of the Prior Art] In recent years, by the spread of the Internet, many documents are described by the markup language called HTML, are offered by the WWW server (HTTP server), and are accessible from the terminal linked to the Internet. The document described by HTML is read by the application called web browser, and a web browser is interpreting the tag embedded into the document, and arranges and displays a document and a picture on a terminal screen. The object in a document may be specified by the identifier of not the object itself but the place which it set, and an object in that case. In such a case, a web browser accesses the specified place (described by the descriptor called URL), reads the specified object, and compounds and displays it on a document.
[0003] In case a host computer prints this HTML document, it sends out to a printer the image data (picture which is the aggregate of an object) formed of the web browser like the usual document using the function of an operating system. Image data is changed into the form which can be interpreted by the printer by the printer driver corresponding to the printer used in that case.
[0004] Thus, the process of changing into the form which can further be interpreted by the printer after collecting all required objects and changing into a display format, in order for a host computer to print a HTML document was stepped on.
[0005] On the other hand, a markup language called XML which extended HTML is also spreading. XML can extend an original tag which adds a meaning to specification of the expression method, or the character string in a text by expressing the structure of a document with a document type definition file called DTD (document type definition). A markup language called XHTML which defined HTML by this XML is also being used.
[0006]
[Problem(s) to be Solved by the Invention] Thus, for printing of a HTML document, the host computer had to perform many processings of collection and conversion of data, and its burden was large.
[0007] Moreover, standardization is advanced, markup languages, such as XML, HTML, and XHTML, are not concerned with an operating system or an application program, but if it is the document described by these markup languages, the organization against which the compatibility is secured is ready. The printer which interprets and prints the language itself even if it will not be changed into form that a printer can be interpreted by the host computer, if it is the language which became independent of such hardware and an operating system with very high compatibility, and application is also usable under the environment of the kind from which many differ. With such a printer, the burden of a host computer is mitigable increasingly.
[0008] this invention was accomplished in view of the above-mentioned conventional example, and the document data described in the standardized language can be interpreted in a form as it is, and it aims at offering the printer system which can be printed.
[0009] Furthermore, even if the objects embedded into the document are reference data, such as URL and a file name, it aims at offering the printer system which can collect objects from these references data, can be made to be able to complete a document, and can be made to print.
[0010] Furthermore, it aims at offering the printer system which can be printed by receiving not the document itself but reference data.
[0011] Furthermore, it aims at offering the printer system which can change and print a layout simply about one document.
[0012]
[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention consists of the following composition.
[0013] When it is the printer system connected to the network, and printing directions data receive and it is place data which specified the place on the network of document data, it has an acquisition means gain document data from the specified place, an interpretation means interpret the document data which gained by the aforementioned acquisition means, and a printing means carry out a rendering based on the document data interpreted by the

aforementioned interpretation means, and print.
[0014] Moreover, preferably, it has further a distinction means to distinguish whether it is place data with which it specified the place on the network of document data when printing directions data are received, or it is document data, and the aforementioned interpretation means interprets the document data, when printing directions data are document data.
[0015] Moreover, preferably, format is unfixed document data, the aforementioned document data have a conversion means to change the aforementioned interpretation means into form that the aforementioned document data can be interpreted, and, as for this conversion means, the format at the time of printing is decided with reference to format information at the time of conversion of document data.
[0016] Moreover, the aforementioned conversion means decides the format of the aforementioned document data preferably according to the style sheet which defined the format of document data beforehand.
[0017] Moreover, preferably, if specification of the object which should be embedded to the aforementioned document data is found out, the aforementioned interpretation means will gain the object specified based on specification of the object concerned, and will embed it in the appointed place of the aforementioned document data.
[0018] Moreover, first, it has a cache means to store the object which acquired the aforementioned interpretation means preferably, and the object is embedded to the aforementioned document data, and in case the object specified based on specification of the aforementioned object is gained, if stored there with reference to the aforementioned cache means, if not stored, an object will be gained with reference to the specified position.
[0019] Moreover, it has preferably a decode means to decode coded data, further.
[0020] Moreover, preferably, the aforementioned printing means is further equipped with a color matching means to adjust the color of the aforementioned document data, and the color information outputted by the aforementioned color printing function, in order to have a color printing function and to carry out color printing by this color printing function.
[0021] Or it is format-conversion equipment connected to the printer which can process the document data described in the predetermined language, and a network, and if document data receive, it will have a conversion means change the document data into form that the aforementioned printer can process, with reference to the format information specified to the document concerned, and an acquisition means acquire the functional information on the aforementioned printer on the occasion of conversion by the aforementioned conversion means.
[0022] Moreover, the aforementioned conversion means changes the document data of XML or HTML form into the document data of SVG form preferably.
[0023] Or if it is the printer connected to the format conversion equipment changed into form that document data can be processed, and the network and printing directions data are received An acquisition means to gain document data from the specified place when it is place data which specified the place on the network of document data, The conversion means which transmits the document data gained to the aforementioned format conversion equipment, and is transformed to the form which can be processed, It has an interpretation means to interpret the document data changed by the aforementioned conversion means, and a printing means to carry out a rendering based on the document data interpreted by the aforementioned interpretation means, and to print.
[0024] Still more preferably, if specification of the object which should be embedded to the aforementioned document data is found out, the aforementioned interpretation means will gain the specified object based on specification of the object concerned, and will embed it in the appointed place of the aforementioned document data.
[Detailed description] The XML printer system which is the gestalt of operation of a [gestalt of the 1st operation] this invention is explained with reference to a drawing below.
[0025] Drawing 1 is drawing showing the outline of the XML printer system in this operation gestalt. The client 101 of a printer publishes the print demand which gains the HTML page of the location which connected to the Internet and the user specified, and is called (1) and job ticket to the XML print system which has formatting server 100a and XML printer 100b (2). The HTML document itself may be contained in this demand, and URL which specifies the whereabouts of a document may be contained instead of the document itself. Moreover, the XML print system 100 may have a formatting server in a back-end, and it may be in a front end. Anyway, although the equipment of the direction in a front end serves as a sink of a job ticket, each function itself to achieve does not change. Here, formatting server 100a explains as a thing in a front end.
[0026] When the document itself is contained in a job ticket (i.e., when it is direct printing), XML printer 100b transmits the document to a formatting server, and is made to change it into a SVG document from a HTML document. It is data described in the language called SVG using the tag like HTML, and SVG is defined as SVG data using XML. Moreover, SVG has the function to define the appearance of the document in every page. Drawing 7 is drawing showing an example of the document changed into SVG from XHTML. An XHTML document will change a layout in connection with it, if a layout is not fixed but a viewing area is changed into the state of a document 703 from the state of a document 701. However, if it changes into SVG with reference to the layout information specified separately, an output layout can be decided like a document 702. The coordinate [document / 703 / SVG] position in the interval of a character and the page of a picture etc. is described.
[0027] And if XML printer 100b receives the data of SVG form from formatting server 100a, it will make the SVG interpreter which (4) XML printer 100b has interpret the data, and will print.
[0028] When URL of the page which should be printed at a job ticket is contained on the other hand (i.e., when it is

reference printing), formatting server 100a analyzes the received job ticket, and acquires a HTML page from a web server 103 based on specified URL (3). And the data of HTML form are changed into the data of SVG form, and the data of SVG form are transmitted to XML printer 100b (4). The following serves as the same procedure as the case of a direct printer.

[0029] Moreover, when the tag which refers to an object is embedded in SVG data, XML printer 100b downloads an object, for example, an image data, from the reference place, embeds an image in the specified position in (5) and a document (position of a tag), and prints it. The reference place in this case also has the case of URL, when [if it is,] the path of a directory is described, the case of a mere file name, and. A reference place is authorized and referred to according to each case.

[0030] Drawing 6 is drawing (a) and drawing (b) showing the example of the printing screen in a user. Drawing (a) is the example of the printing screen in the web browser of a host computer, and drawing (b) is the example of the printing screen in a personal digital assistant. In the case of printing, a host computer (web browser) **** personal digital assistant incorporates and carries out a screen display of the HTML page by which the printing screen was defined from an XML printer. A user inputs a desired value into a required part, looking at the screen. Then, a host computer adds the inputted value to a job ticket, and transmits to an XML printer. As an input column, the printer address, URL of the document which should be printed, number of copies, a paper size, page orientation, a margin, the style sheet to be used, operation (specification of preview, direct printing, and reference printing), etc. can be specified.

[0031] As operation, specification of direct printing transmits a job ticket for the document read from specified URL to an XML printer. The value of number of copies, a paper size, page orientation, a margin, the style sheet to be used, and operation (specification of preview, direct printing, and reference printing) is included in the job ticket, respectively.

[0032] On the other hand, specification of reference printing transmits URL of the specified document to a printer as a job ticket. Also in this case, the value of URL of the document which should be printed, number of copies, a paper size, page orientation, a margin, the style sheet to be used, and operation (specification of preview, direct printing, and reference printing) is included in the job ticket, respectively.

[0033] Drawing 2 is the block diagram of an XML print system in case the formatting server 202 is in a back-end. A user's host computer or personal digital assistant 204 is a HTTP client, for example, the web browser program etc. is performed. The XML printer 201 has HTTP client 201a for exchanging HTTP server 103a and data which HTTP server 202a which the formatting server 202 has, and the document server 203 have, and XML controller 201b later mentioned for controlling a printer. The document server 203 should just be the usual HTTP server (WWW server) connected to the Internet. The document offered from this document server is printed by the XML printer 201.

[0034] The formatting server 202 contains HTTP server 202a and XHTML formatter 202b. XHTML formatter 202b has the function to change the data of HTML form, and the data of XML form into XHTML form, and to change it into SVG form so that it may mention later.

[0035] Drawing 13 is the block diagram of a general purpose computer usable as a formatting server, and drawing 14 is the block diagram of an XML printer.

[0036] In drawing 13 , a computer 3000 is equipped with CPU1 for carrying out the function as a formatting server later mentioned based on the processing program memorized by ROM for a program of ROM3, and CPU1 controls in generalization each device connected to a system bus 4. RAM2 functions as the main memory of CPU1, a work area, etc. The keyboard controller (KBC) 5 controls the key input from a keyboard 9 or a non-illustrated pointing device. The CRT controller (CRTC) 6 controls the display of CRT display 10. A disk controller (DKC) 7 controls access with the external memory 11 which memorizes a boot program, various applications, font data, a user file, an edit file, etc., such as a hard disk (HD) and a floppy (registered trademark) disk (FD). A formatting server is equipped with the interface not only linked to LAN but the public or a leased telephone circuit although the LAN control section 8 is controlled by LAN. In addition, CPU1 performs expansion (rasterize) processing of the outline font of display information RAM HE set up for example, on RAM2, and makes possible WYSIWYG (function which makes in agreement the content of a display, and the content of printing) on CRT10. Moreover, CPU1 opens the various windows registered based on the command directed by the mouse cursor which is not illustrated on CRT10, and performs various data processing.

[0037] In drawing 14 , a printer CPU 12 controls in generalization access with various kinds of devices connected to a system bus 15 based on the control program memorized by the control program memorized by ROM for a program of ROM13, and outputs the picture signal as a print-out to the printing section (printer engine) 17 connected through printing section I/F16. The communications processing with a host computer of CPU12 has become possible through bidirectional I/F21, and the host computer 3000 constitutes the information in a printer etc. possible [a notice]. RAM19 is RAM which functions as the main memory of CPU21, a work area, etc. It connects with a computer 3000 through LAN, a dedicated line, a public line, etc., and the input section 18 is constituted by the host computer 3000 possible [a notice] in document data, URL, etc. A memory controller (MC) 20 controls access with external memory 14, such as a boot program, various applications, font data, a user file, a hard disk (HD) in which the procedure of the flow chart mentioned later carries out program code storage, and a floppy disk (FD). The control unit 1012 contains the display panel and the keyboard, and makes offer of the information to an operator, and the directions from an operator input.

[0038] <XML controller> drawing 3 is the block diagram of XML controller 201b in the XML printer 201.

[0039] In reference printing besides being a setup of document attributes, such as analysis of the XML data

appended to the published job ticket, and a paper size, a delivery bottle, a layout, etc., in drawing, the job ticket interpreter 301 starts the document collector 302 mentioned later.
[0040] The document collector 302 contains a HTTP client and an IPP server. It connects with the TCP/IP network and a HTTP client acquires the resource of specified URL. Moreover, the paper size which is information required for the conversion in a server is notified. Furthermore, the document file manager 303 is started and management of the error in a document, the layered structure of a document, management of a cache, etc. are made to perform.
[0041] The document parser 304 performs analysis of the data structure of SVG form, and ejection of the embedded data (for example, image data). Moreover, distribution of the load to each processing module for every function and job end processing at the time of error event generating are performed, and further, in case data are URL, starting of a document collector is also performed.
[0042] The SVG interpreter 305 has the function arranged as [the specified object] the data of SVG form were interpreted and it was specified. Therefore, it processes changing into a device value the coordinate by which an object is arranged from a logical value etc. Others are equipped also with the CSS interpreter as an interpreter.
[0043] In addition, when a printer has a color printing function, in order to double with the color of a printer the color specified by document data, the SVG interpreter has the so-called color matching function.
[0044] The XML graphic library 307 provides a renderer 308 with the drawing function which ran short, and has the function which absorbs a renderer dependence portion. The data of the form in which the rendering processing by the renderer 308 is possible are generated by the XML graphic library 307.
[0045] A renderer 308 generates the data of bit map form, and is made to send out and print them on the printer engine 309.
[0046] A decoder 310 decodes compression images, such as JPEG and GIF.
[0047] The KYAPA kinky thread tee descriptor 311 transmits the information about functions (image-processing function etc.), capacity, etc. of a printer (resolution etc.) to a formatting server.
[0048] The rendering of the data which interpreted the job ticket, gained resources (HTML or XML form), such as a required document and an image, by the above composition, were transformed to SVG form by the formatting server if needed, and were changed is carried out, and printing ****** can do it.
[0049] <Composition of formatting server> drawing 4 is the block diagram of the formatting server 202.
[0050] In the formatting server 202, if it is information required for formatting of the paper size sent from the document collector 302, and reference printing and the document request receiver 405 is direct printing about URL of a document, he will receive the data of XML or HTML form. Moreover, the document request receiver 405 transmits the document file and picture data file which were described using the tag set of SVG changed from XML or HTML to the document collector 302.
[0051] A translator 402 reads a style sheet etc. from a file system 403 if needed, HTML and XML data are changed into XHTML form, and the data is further changed into SVG form by the formatter 401. Since XHTML form is HTML defined as having explained previously by XML, it is comparatively easy also for conversion from XML. [of conversion from HTML]
[0052] Moreover, although it is form that SVG is also defined by XML, this conversion is performed with reference to the size information received with the document request receivers 405, such as a function, capacity, etc. of a printer which were received by the KYAPA kinky thread tee register 404. for example, the time of printing to XHTML -- a page -- since there is no concept, in the case of conversion to SVG, you have to carry out a page break At this time, a paper size and information, such as resolution, are referred to for the determination of a break position etc.
[0053] Thus, the changed data of SVG form are passed to the document request receiver 405, and are transmitted to XML controller 101b of an XML printer from there.
[0054] In this way, the data described by HTML or XML are changed into SVG by the formatting server 202, and are inputted into the XML printer 201.
[0055] If it is analyzed by the document parser 304 and there is a pad object as explained previously, they will read it, the data of SVG inputted into the XML printer 201 are embedded in a document, and a printout will be carried out after being orthopedically operated by the specified format.
[0056] <Printing procedure> drawing 5 shows an operator's order of the message at the time of reference printing between an XML printer, and a formatting server and a document server.
[0057] First, if a job ticket is published to an XML printer, an XML printer will read the document from a document server according to URL of the specified document (502), and will gain the specified HTML document (504). Once an XML printer stores it, it transmits the HTML document gained from the document server to a formatting server, and is made to change it into SVG form (506). A formatting server requires and (508) acquires information, such as information, such as a paper size which is needed at the time of conversion, and resolution about the performance of a printer, to an XML printer (510).
[0058] A formatting server changes a HTML document into a SVG document with reference to those information, and returns it to an XML printer (512).
[0059] If an XML printer analyzes the SVG document which received and has embedded URL, that the object specified by it should be gained, a document server will be accessed (514) and an object will be gained (516).
[0060] In the above-mentioned sequence, the procedure of an XML printer and each formatting server is as follows. Drawing 11 shows the flow chart of the procedure of an XML printer which received the job ticket from the user, and drawing 12 shows the flow chart of the procedure of the formatting server which received XML or the HTML

document from the XML printer.
[0061] In drawing 11 , if a job ticket is published to an XML printer, it will judge whether the operation which received it and was specified is reference printing, or an XML printer is direct printing (Step S1100). If it is reference printing, the document specified by URL will be read from a document server using a HTTP client function (Step S1101). In addition, with reference to a cache, the document and object by which the cache is carried out are first read from a cache at this time.
[0062] When a document is able to be gained, the XML document or HTML document with which the job ticket received the HTML document which was gained in reference printing in direct printing is transmitted to a formatting server (Step S1102).
[0063] Then, after exchange of printer KYAPA kinky thread tee information is performed between formatting servers if needed, a SVG document is received from a formatting server (Step S1103). And it is judged whether there is any pad object by analyzing the document (Step S1104), if it judges (Step S1105) and there is an object, the object will be either a HTML document or an XML document, or it is the picture which is neither a HTML document nor an XML document (Step S1107). If it is a bit map picture, JPEG, a GIF picture, etc. when it is not any, either for example, the object will be acquired based on URL and the judgment of a pad object will be repeated again (Step S1105). At this time, the hard disk etc. carries out the cache field cache of the document and object which were acquired, and they are referred to in Step S1001.
[0064] If processing of a pad object is finished, the rendering of the SVG document will be carried out, it will be bit-map-ized, and it will be made to print from a printer engine (Step S1106).
[0065] In drawing 12 , first, a formatting server will require and acquire printer KYAPA kinky thread tee information for the controller of an XML printer, if XML or a HTML document is received from an XML printer (Step S1201). And the HTML document which received is changed into an XHTML document (Step S1202). Under the present circumstances, with reference to the style sheet specified with the job ticket, a HTML document is inserted in the format of the document defined by the style sheet, and it considers as the XHTML document of a new form. The layout of the typeface of a character, size, the method of a paragraph division, and a picture etc. is defined by the style sheet, for example.
[0066] The document once changed into XHTML is changed into a SVG document with reference to the function and performance of a printer which were acquired at Step S1201 (Step S1203).
[0067] The HTML document defined as what should originally be displayed as mentioned above is convertible for the SVG document of the page unit printed by referring to a style sheet and printer KYAPA kinky thread tee information.
[0068] Thus, printing by the printer is attained as it is by changing the document described by HTML or XHTML into the SVG form defined by XML. It is not necessary to complete a document and to change the document into the form which can be interpreted by the printer with a host computer, like the conventional printing system, in this system. Even if the objects which should be embedded into it are reference data, such as URL and a file name, a printer can collect objects from these references data, can complete a document, and can make a document print in this system.
[0069] Therefore, output processing in the host computer for [a host computer / the conventional printer driver becomes unnecessary and] printing is lost, and a host's load is mitigated.
[0070] Moreover, there is not even need of passing the document itself to a printer and reference printing can be made to perform by passing reference data, such as URL, to a printer.
[0071] Since the object furthermore embedded has been independent of a document, even when changing the object, the whole document edits, and curing etc. is unnecessary and just needs to replace the object. Therefore, if an object is a picture, it will be ready of the picture of the resolution in which a display differs from printing.
[0072] Furthermore, by carrying out the cache of a document or the object, as long as it has stored in the cache, it is not necessary to acquire an object through communication.
[0073] Furthermore, it is possible to change and print a layout by changing a style sheet by using the style sheet, even if it is one document.
[0074] Furthermore, since the function to decode coded data, such as JPEG and GIF, is built in a printer, the load in a host computer is mitigable.
[0075] <Variation of printing procedure> drawing 8 is the ** type view showing the situation of reference printing performed by the above composition. In drawing 8 , if a job ticket is transmitted to an XML printer, as for (1) and an XML printer, it will be transmitted to a formatting [a document server-cum-] server, and a formatting [(2) document server-cum-] server will gain the main part of a document from URL which received (3). When a formatting [a document server-cum-] server receives the document, it changes into SVG form, and it transmits to (4) and an XML printer and they are made to print (5).
[0076] Although the XML printer was gaining the document, in this way, the conversion to a formatting [a document server-cum-] server to document acquisition and SVG form can be made to be able to process, and a printer can also consist of systems mentioned above so that reception and printing of a job ticket may be performed. In this system configuration, a printer waits to input a SVG document from a formatting server, and should just print. All processings of drawing 11 and drawing 12 are performed by the formatting server.
[0077] Drawing 9 is the ** type view showing other gestalten of direct printing. If the document of XML form is outputted from a word processor etc. and a user receives the document at a terminal, a user will add specification of format etc. to the document, and will transmit to a server (it serves as a formatting server in drawing 9). This

serves as a job ticket (1). A server transmits it to an XML printer, it transmits to a formatting server and (2) and an XML printer are transformed to SVG form (3). A formatting server makes an XML printer transmit and print the document changed into SVG (4). Moreover, a user terminal may append the document of XML form to an E-mail, and may transmit to a server. A server receives the E-mail, changes the appended document into the data of SVG form, and transmits to an XML printer.

[0078] As mentioned above, even if the functional assignment with a formatting server and an XML printer may change, there is no place which changes to the function and effect as a system as shown by this example.

[0079] The storage which recorded the program code of the software which realizes the function of the operation gestalt which the purpose of this invention mentioned above which is [the gestalt of other operations] is supplied to a system or equipment, and it is attained also by reading and performing the program code with which the computer (or CPU and MPU) of the system or equipment was stored in the storage.

[0080] In this case, the program code itself read from the storage will realize the new function of this invention, and the storage memorized to the program code will constitute this invention.

[0081] Moreover, device information data may be held at the accessible server etc. from HDD built in an image processing system and image data expansion equipment, the storage by which external connection is made, and image data expansion equipment. Furthermore, device information data can use what the user set up arbitrarily.

[0082] As a storage for supplying a program code, a floppy disk, a hard disk, an optical disk, a magneto-optic disk, CD-ROM, CD-R, a magnetic tape, nonvolatile memory card, ROM, etc. can be used, for example.

[0083] Moreover, by performing the program code which the computer read, OS (operating system) which the function of the operation form mentioned above is not only realized, but is working on a computer based on directions of the program code performs a part or all of actual processing, and when the function of the form of operation mentioned above by the processing is realized, it is contained.

[0084] Furthermore, after the program code read from the storage is written in the memory with which the expansion unit connected to the expansion board inserted in the computer or the computer is equipped, based on directions of the program code, a part or all of processing that CPU with which the expansion board and expansion unit are equipped is actual is performed, and when the function of the operation form mentioned above by the processing is realized, it is contained.

[0085] When applying this invention to the above-mentioned storage, the program code corresponding to the flow chart (shown in drawing 11 or drawing 12) explained previously will be stored in the storage.

[0086]

[Effect of the Invention] As explained above, the document data which were described in the standardized language according to this invention can be interpreted in a form as it is, and the printer system which can be printed can be realized.

[0087] Furthermore, even if the objects embedded into the document are reference data, such as URL and a file name, they can collect objects from these references data, can complete a document, and can make it print.

[0088] Furthermore, it can print by receiving not the document itself but reference data.

[0089] Furthermore, it is possible to change and print a layout simply about one document.

[Translation done.]

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TECHNICAL FIELD

[The technical field to which invention belongs] this invention relates to the printer system for printing the document described by the markup language which defines the appearance of a document by specifying the logical structure of objects, such as a character and a picture, especially as it is about the printer system for printing the document data created with the host computer.

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PRIOR ART

[Description of the Prior Art] In recent years, by the spread of the Internet, many documents are described by the markup language called HTML, are offered by the WWW server (HTTP server), and are accessible from the terminal linked to the Internet. The document described by HTML is read by the application called web browser, and a web browser is interpreting the tag embedded into the document, and arranges and displays a document and a picture on a terminal screen. The object in a document may be specified by the identifier of not the object itself but the place which it set, and an object in that case. In such a case, a web browser accesses the specified place (described by the descriptor called URL), reads the specified object, and compounds and displays it on a document.

[0003] In case a host computer prints this HTML document, it sends out to a printer the image data (picture which is the aggregate of an object) formed of the web browser like the usual document using the function of an operating system. Image data is changed into the form which can be interpreted by the printer by the printer driver corresponding to the printer used in that case.

[0004] Thus, the process of changing into the form which can further be interpreted by the printer after collecting all required objects and changing into a display format, in order for a host computer to print a HTML document was stepped on.

[0005] On the other hand, a markup language called XML which extended HTML is also spreading. XML can extend an original tag which adds a meaning to specification of the expression method, or the character string in a text by expressing the structure of a document with a document type definition file called DTD (document type definition). A markup language called XHTML which defined HTML by this XML is also being used.

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EFFECT OF THE INVENTION

[Effect of the Invention] As explained above, the document data which were described in the standardized language according to this invention can be interpreted in a form as it is, and the printer system which can be printed can be realized.
[0087] Furthermore, even if the objects embedded into the document are reference data, such as URL and a file name, they can collect objects from these references data, can complete a document, and can make it print.
[0088] Furthermore, it can print by receiving not the document itself but reference data.
[0089] Furthermore, it is possible to change and print a layout simply about one document.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] Thus, for printing of a HTML document, the host computer had to perform many processings of collection and conversion of data, and its burden was large.
[0007] Moreover, standardization is advanced, markup languages, such as XML, HTML, and XHTML, are not concerned with an operating system or an application program, but if it is the document described by these markup languages, the organization against which the compatibility is secured is ready. The printer which interprets and prints the language itself even if it will not be changed into form that a printer can be interpreted by the host computer, if it is the language which became independent of such hardware and an operating system with very high compatibility, and application is also usable under the environment of the kind from which many differ. With such a printer, the burden of a host computer is mitigable increasingly.
[0008] this invention was accomplished in view of the above-mentioned conventional example, and the document data described in the standardized language can be interpreted in a form as it is, and it aims at offering the printer system which can be printed.
[0009] Furthermore, even if the objects embedded into the document are reference data, such as URL and a file name, it aims at offering the printer system which can collect objects from these references data, can be made to be able to complete a document, and can be made to print.
[0010] Furthermore, it aims at offering the printer system which can be printed by receiving not the document itself but reference data.
[0011] Furthermore, it aims at offering the printer system which can change and print a layout simply about one document.

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MEANS

[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention consists of the following composition.
[0013] When it is the printer system connected to the network, and printing directions data receive and it is place data which specified the place on the network of document data, it has an acquisition means gain document data from the specified place, an interpretation means interpret the document data which gained by the aforementioned acquisition means, and a printing means carry out a rendering based on the document data interpreted by the aforementioned interpretation means, and print.
[0014] Moreover, preferably, it has further a distinction means to distinguish whether it is place data with which it specified the place on the network of document data when printing directions data are received, or it is document data, and the aforementioned interpretation means interprets the document data, when printing directions data are document data.
[0015] Moreover, preferably, format is unfixed document data, the aforementioned document data have a conversion means to change the aforementioned interpretation means into form that the aforementioned document data can be interpreted, and, as for this conversion means, the format at the time of printing is decided with reference to format information at the time of conversion of document data.
[0016] Moreover, the aforementioned conversion means decides the format of the aforementioned document data preferably according to the style sheet which defined the format of document data beforehand.
[0017] Moreover, preferably, if specification of the object which should be embedded to the aforementioned document data is found out, the aforementioned interpretation means will gain the object specified based on specification of the object concerned, and will embed it in the appointed place of the aforementioned document data.
[0018] Moreover, first, it has a cache means to store the object which acquired the aforementioned interpretation means preferably, and the object is embedded to the aforementioned document data, and in case the object specified based on specification of the aforementioned object is gained, if stored there with reference to the aforementioned cache means, if not stored, an object will be gained with reference to the specified position.
[0019] Moreover, it has preferably a decode means to decode coded data, further.
[0020] Moreover, preferably, the aforementioned printing means is further equipped with a color matching means to adjust the color of the aforementioned document data, and the color information outputted by the aforementioned color printing function, in order to have a color printing function and to carry out color printing by this color printing function.
[0021] Or it is format-conversion equipment connected to the printer which can process the document data described in the predetermined language, and a network, and if document data receive, it will have a conversion means change the document data into form that the aforementioned printer can process, with reference to the format information specified to the document concerned, and an acquisition means acquire the functional information on the aforementioned printer on the occasion of conversion by the aforementioned conversion means.
[0022] Moreover, the aforementioned conversion means changes the document data of XML or HTML form into the document data of SVG form preferably.
[0023] Or if it is the printer connected to the format conversion equipment changed into form that document data can be processed, and the network and printing directions data are received An acquisition means to gain document data from the specified place when it is place data which specified the place on the network of document data, The conversion means which transmits the document data gained to the aforementioned format conversion equipment, and is transformed to the form which can be processed, It has an interpretation means to interpret the document data changed by the aforementioned conversion means, and a printing means to carry out a rendering based on the document data interpreted by the aforementioned interpretation means, and to print.
[0024] Still more preferably, if specification of the object which should be embedded to the aforementioned document data is found out, the aforementioned interpretation means will gain the specified object based on specification of the object concerned, and will embed it in the appointed place of the aforementioned document data.
[Detailed description] The XML printer system which is the form of operation of a [form of the 1st operation] this invention is explained with reference to a drawing below.
[0025] Drawing 1 is drawing showing the outline of the XML printer system in this operation form. The client 101 of a printer publishes the print demand which gains the HTML page of the location which connected to the Internet

and the user specified, and is called (1) and job ticket to the XML print system which has formatting server 100a and XML printer 100b (2). The HTML document itself may be contained in this demand, and URL which specifies the whereabouts of a document may be contained instead of the document itself. Moreover, the XML print system 100 may have a formatting server in a back-end, and it may be in a front end. Anyway, although the equipment of the direction in a front end serves as a sink of a job ticket, each function itself to achieve does not change. Here, formatting server 100a explains as a thing in a front end.

[0026] When the document itself is contained in a job ticket (i.e., when it is direct printing), XML printer 100b transmits the document to a formatting server, and is made to change it into a SVG document from a HTML document. It is data described in the language called SVG using the tag like HTML, and SVG is defined as SVG data using XML. Moreover, SVG has the function to define the appearance of the document in every page. Drawing 7 is drawing showing an example of the document changed into SVG from XHTML. An XHTML document will change a layout in connection with it, if a layout is not fixed but a viewing area is changed into the state of a document 703 from the state of a document 701. However, if it changes into SVG with reference to the layout information specified separately, an output layout can be decided like a document 702. The coordinate [document / 703 / SVG] position in the interval of a character and the page of a picture etc. is described.

[0027] And if XML printer 100b receives the data of SVG form from formatting server 100a, it will make the SVG interpreter which (4) XML printer 100b has interpret the data, and will print.

[0028] When URL of the page which should be printed at a job ticket is contained on the other hand (i.e., when it is reference printing), formatting server 100a analyzes the received job ticket, and acquires a HTML page from a web server 103 based on specified URL (3). And the data of HTML form are changed into the data of SVG form, and the data of SVG form are transmitted to XML printer 100b (4). The following serves as the same procedure as the case of a direct printer.

[0029] Moreover, when the tag which refers to an object is embedded in SVG data, XML printer 100b downloads an object, for example, an image data, from the reference place, embeds an image in the specified position in (5) and a document (position of a tag), and prints it. The reference place in this case also has the case of URL, when [if it is,] the path of a directory is described, the case of a mere file name, and. A reference place is authorized and referred to according to each case.

[0030] Drawing 6 is drawing (a) and drawing (b) showing the example of the printing screen in a user. Drawing (a) is the example of the printing screen in the web browser of a host computer, and drawing (b) is the example of the printing screen in a personal digital assistant. In the case of printing, a host computer (web browser) **** personal digital assistant incorporates and carries out a screen display of the HTML page by which the printing screen was defined from an XML printer. A user inputs a desired value into a required part, looking at the screen. Then, a host computer adds the inputted value to a job ticket, and transmits to an XML printer. As an input column, the printer address, URL of the document which should be printed, number of copies, a paper size, page orientation, a margin, the style sheet to be used, operation (specification of preview, direct printing, and reference printing), etc. can be specified.

[0031] As operation, specification of direct printing transmits a job ticket for the document read from specified URL to an XML printer. The value of number of copies, a paper size, page orientation, a margin, the style sheet to be used, and operation (specification of preview, direct printing, and reference printing) is included in the job ticket, respectively.

[0032] On the other hand, specification of reference printing transmits URL of the specified document to a printer as a job ticket. Also in this case, the value of URL of the document which should be printed, number of copies, a paper size, page orientation, a margin, the style sheet to be used, and operation (specification of preview, direct printing, and reference printing) is included in the job ticket, respectively.

[0033] Drawing 2 is the block diagram of an XML print system in case the formatting server 202 is in a back-end. A user's host computer or personal digital assistant 204 is a HTTP client, for example, the web browser program etc. is performed. The XML printer 201 has HTTP client 201a for exchanging HTTP server 103a and data which HTTP server 202a which the formatting server 202 has, and the document server 203 have, and XML controller 201b later mentioned for controlling a printer. The document server 203 should just be the usual HTTP server (WWW server) connected to the Internet. The document offered from this document server is printed by the XML printer 201.

[0034] The formatting server 202 contains HTTP server 202a and XHTML formatter 202b. XHTML formatter 202b has the function to change the data of HTML form, and the data of XML form into XHTML form, and to change it into SVG form so that it may mention later.

[0035] Drawing 13 is the block diagram of a general purpose computer usable as a formatting server, and drawing 14 is the block diagram of an XML printer.

[0036] In drawing 13 , a computer 3000 is equipped with CPU1 for carrying out the function as a formatting server later mentioned based on the processing program memorized by ROM for a program of ROM3, and CPU1 controls in generalization each device connected to a system bus 4. RAM2 functions as the main memory of CPU1, a work area, etc. The keyboard controller (KBC) 5 controls the key input from a keyboard 9 or a non-illustrated pointing device. The CRT controller (CRTC) 6 controls the display of CRT display 10. A disk controller (DKC) 7 controls access with the external memory 11 which memorizes a boot program, various applications, font data, a user file, an edit file, etc., such as a hard disk (HD) and a floppy (registered trademark) disk (FD). A formatting server is equipped with the interface not only linked to LAN but the public or a leased telephone circuit although the LAN control section 8 is controlled by LAN. In addition, CPU1 performs expansion (rasterize) processing of the outline font of

display information RAM HE set up for example, on RAM2, and makes possible WYSIWYG (function which makes in agreement the contents of a display, and the contents of printing) on CRT10. Moreover, CPU1 opens the various windows registered based on the command directed by the mouse cursor which is not illustrated on CRT10, and performs various data processing.

[0037] In drawing 14 , a printer CPU 12 controls in generalization access with various kinds of devices connected to a system bus 15 based on the control program memorized by the control program memorized by ROM for a program of ROM13, and outputs the picture signal as a print-out to the printing section (printer engine) 17 connected through printing section I/F16. The communications processing with a host computer of CPU12 has become possible through bidirectional I/F21, and the host computer 3000 constitutes the information in a printer etc. possible [a notice]. RAM19 is RAM which functions as the main memory of CPU21, a work area, etc. It connects with a computer 3000 through LAN, a dedicated line, a public line, etc., and the input section 18 is constituted by the host computer 3000 possible [a notice] in document data, URL, etc. A memory controller (MC) 20 controls access with external memory 14, such as a boot program, various applications, font data, a user file, a hard disk (HD) in which the procedure of the flow chart mentioned later carries out program code storage, and a floppy disk (FD). The control unit 1012 contains the display panel and the keyboard, and makes offer of the information to an operator, and the directions from an operator input.

[0038] <XML controller> drawing 3 is the block diagram of XML controller 201b in the XML printer 201.

[0039] In reference printing besides being a setup of document attributes, such as analysis of the XML data appended to the published job ticket, and a paper size, a delivery bottle, a layout, etc., in drawing, the job ticket interpreter 301 starts the document collector 302 mentioned later.

[0040] The document collector 302 contains a HTTP client and an IPP server. It connects with the TCP/IP network and a HTTP client acquires the resource of specified URL. Moreover, the paper size which is information required for the conversion in a server is notified. Furthermore, the document file manager 303 is started and management of the error in a document, the layered structure of a document, management of a cache, etc. are made to perform.

[0041] The document parser 304 performs analysis of the data structure of SVG form, and ejection of the embedded data (for example, image data). Moreover, distribution of the load to each processing module for every function and job end processing at the time of error event generating are performed, and further, in case data are URL, starting of a document collector is also performed.

[0042] The SVG interpreter 305 has the function arranged as [the specified object] the data of SVG form were interpreted and it was specified. Therefore, it processes changing into a device value the coordinate by which an object is arranged from a logical value etc. Others are equipped also with the CSS interpreter as an interpreter.

[0043] In addition, when a printer has a color printing function, in order to double with the color of a printer the color specified by document data, the SVG interpreter has the so-called color matching function.

[0044] The XML graphic library 307 provides a renderer 308 with the drawing function which ran short, and has the function which absorbs a renderer dependence portion. The data of the form in which the rendering processing by the renderer 308 is possible are generated by the XML graphic library 307.

[0045] A renderer 308 generates the data of bit map form, and is made to send out and print them on the printer engine 309.

[0046] A decoder 310 decodes compression images, such as JPEG and GIF.

[0047] The KYAPA kinky thread tee descriptor 311 transmits the information about functions (image-processing function etc.), capacity, etc. of a printer (resolution etc.) to a formatting server.

[0048] The rendering of the data which interpreted the job ticket, gained resources (HTML or XML form), such as a required document and an image, by the above composition, were transformed to SVG form by the formatting server if needed, and were changed is carried out, and printing ****** can do it.

[0049] <Composition of formatting server> drawing 4 is the block diagram of the formatting server 202.

[0050] In the formatting server 202, if it is information required for formatting of the paper size sent from the document collector 302, and reference printing and the document request receiver 405 is direct printing about URL of a document, he will receive the data of XML or HTML form. Moreover, the document request receiver 405 transmits the document file and picture data file which were described using the tag set of SVG changed from XML or HTML to the document collector 302.

[0051] A translator 402 reads a style sheet etc. from a file system 403 if needed, HTML and XML data are changed into XHTML form, and the data is further changed into SVG form by the formatter 401. Since XHTML form is HTML defined as having explained previously by XML, it is comparatively easy also for conversion from XML. [of conversion from HTML]

[0052] Moreover, although it is form that SVG is also defined by XML, this conversion is performed with reference to the size information received with the document request receivers 405, such as a function, capacity, etc. of a printer which were received by the KYAPA kinky thread tee register 404. for example, the time of printing to XHTML -- a page -- since there is no concept, in the case of conversion to SVG, you have to carry out a page break At this time, a paper size and information, such as resolution, are referred to for the determination of a break position etc.

[0053] Thus, the changed data of SVG form are passed to the document request receiver 405, and are transmitted to XML controller 101b of an XML printer from there.

[0054] In this way, the data described by HTML or XML are changed into SVG by the formatting server 202, and are inputted into the XML printer 201.

[0055] If it is analyzed by the document parser 304 and there is a pad object as explained previously, they will read it, the data of SVG inputted into the XML printer 201 are embedded in a document, and a printout will be carried out after being orthopedically operated by the specified format.
[0056] <Printing procedure> drawing 5 shows an operator's order of the message at the time of reference printing between an XML printer, and a formatting server and a document server.
[0057] First, if a job ticket is published to an XML printer, an XML printer will read the document from a document server according to URL of the specified document (502), and will gain the specified HTML document (504). Once an XML printer stores it, it transmits the HTML document gained from the document server to a formatting server, and is made to change it into SVG form (506). A formatting server requires and (508) acquires information, such as information, such as a paper size which is needed at the time of conversion, and resolution about the performance of a printer, to an XML printer (510).
[0058] A formatting server changes a HTML document into a SVG document with reference to those information, and returns it to an XML printer (512).
[0059] If an XML printer analyzes the SVG document which received and has embedded URL, that the object specified by it should be gained, a document server will be accessed (514) and an object will be gained (516).
[0060] In the above-mentioned sequence, the procedure of an XML printer and each formatting server is as follows. Drawing 11 shows the flow chart of the procedure of an XML printer which received the job ticket from the user, and drawing 12 shows the flow chart of the procedure of the formatting server which received XML or the HTML document from the XML printer.
[0061] In drawing 11 , if a job ticket is published to an XML printer, it will judge whether the operation which received it and was specified is reference printing, or an XML printer is direct printing (Step S1100). If it is reference printing, the document specified by URL will be read from a document server using a HTTP client function (Step S1101). In addition, with reference to a cache, the document and object by which the cache is carried out are first read from a cache at this time.
[0062] When a document is able to be gained, the XML document or HTML document with which the job ticket received the HTML document which was gained in reference printing in direct printing is transmitted to a formatting server (Step S1102).
[0063] Then, after exchange of printer KYAPA kinky thread tee information is performed between formatting servers if needed, a SVG document is received from a formatting server (Step S1103). And it is judged whether there is any pad object by analyzing the document (Step S1104), if it judges (Step S1105) and there is an object, the object will be either a HTML document or an XML document, or it is the picture which is neither a HTML document nor an XML document (Step S1107). If it is a bit map picture, JPEG, a GIF picture, etc. when it is not any, either for example, the object will be acquired based on URL and the judgment of a pad object will be repeated again (Step S1105). At this time, the hard disk etc. carries out the cache field cache of the document and object which were acquired, and they are referred to in Step S1001.
[0064] If processing of a pad object is finished, the rendering of the SVG document will be carried out, it will be bit-map-ized, and it will be made to print from a printer engine (Step S1106).
[0065] In drawing 12 , first, a formatting server will require and acquire printer KYAPA kinky thread tee information for the controller of an XML printer, if XML or a HTML document is received from an XML printer (Step S1201). And the HTML document which received is changed into an XHTML document (Step S1202). Under the present circumstances, with reference to the style sheet specified with the job ticket, a HTML document is inserted in the format of the document defined by the style sheet, and it considers as the XHTML document of a new form. The layout of the typeface of a character, size, the method of a paragraph division, and a picture etc. is defined by the style sheet, for example.
[0066] The document once changed into XHTML is changed into a SVG document with reference to the function and performance of a printer which were acquired at Step S1201 (Step S1203).
[0067] The HTML document defined as what should originally be displayed as mentioned above is convertible for the SVG document of the page unit printed by referring to a style sheet and printer KYAPA kinky thread tee information.
[0068] Thus, printing by the printer is attained as it is by changing the document described by HTML or XHTML into the SVG form defined by XML. It is not necessary to complete a document and to change the document into the form which can be interpreted by the printer with a host computer, like the conventional printing system, in this system. Even if the objects which should be embedded into it are reference data, such as URL and a file name, a printer can collect objects from these references data, can complete a document, and can make a document print in this system.
[0069] Therefore, output processing in the host computer for [a host computer / the conventional printer driver becomes unnecessary and] printing is lost, and a host's load is mitigated.
[0070] Moreover, there is not even need of passing the document itself to a printer and reference printing can be made to perform by passing reference data, such as URL, to a printer.
[0071] Since the object furthermore embedded has been independent of a document, even when changing the object, the whole document edits, and curing etc. is unnecessary and just needs to replace the object. Therefore, if an object is a picture, it will be ready of the picture of the resolution in which a display differs from printing.
[0072] Furthermore, by carrying out the cache of a document or the object, as long as it has stored in the cache, it is not necessary to acquire an object through communication.

[0073] Furthermore, it is possible to change and print a layout by changing a style sheet by using the style sheet, even if it is one document.
[0074] Furthermore, since the function to decode coded data, such as JPEG and GIF, is built in a printer, the load in a host computer is mitigable.
[0075] <Variation of printing procedure> drawing 8 is the ** type view showing the situation of reference printing performed by the above composition. In drawing 8 , if a job ticket is transmitted to an XML printer, as for (1) and an XML printer, it will be transmitted to a formatting [a document server-cum-] server, and a formatting [(2) document server-cum-] server will gain the main part of a document from URL which received (3). When a formatting [a document server-cum-] server receives the document, it changes into SVG form, and it transmits to (4) and an XML printer and they are made to print (5).
[0076] Although the XML printer was gaining the document, in this way, the conversion to a formatting [a document server-cum-] server to document acquisition and SVG form can be made to be able to process, and a printer can also consist of systems mentioned above so that reception and printing of a job ticket may be performed. In this system configuration, a printer waits to input a SVG document from a formatting server, and should just print. All processings of drawing 11 and drawing 12 are performed by the formatting server.
[0077] Drawing 9 is the ** type view showing other gestalten of direct printing. If the document of XML form is outputted from a word processor etc. and a user receives the document at a terminal, a user will add specification of format etc. to the document, and will transmit to a server (it serves as a formatting server in drawing 9). This serves as a job ticket (1). A server transmits it to an XML printer, it transmits to a formatting server and (2) and an XML printer are transformed to SVG form (3). A formatting server makes an XML printer transmit and print the document changed into SVG (4). Moreover, a user terminal may append the document of XML form to an E-mail, and may transmit to a server. A server receives the E-mail, changes the appended document into the data of SVG form, and transmits to an XML printer.
[0078] As mentioned above, even if the functional assignment with a formatting server and an XML printer may change, there is no place which changes to the function and effect as a system as shown by this example.
[0079] The storage which recorded the program code of the software which realizes the function of the operation gestalt which the purpose of this invention mentioned above which is [the gestalt of other operations] is supplied to a system or equipment, and it is attained also by reading and performing the program code with which the computer (or CPU and MPU) of the system or equipment was stored in the storage.
[0080] In this case, the program code itself read from the storage will realize the new function of this invention, and the storage memorized to the program code will constitute this invention.
[0081] Moreover, device information data may be held at the accessible server etc. from HDD built in an image processing system and image data expansion equipment, the storage by which external connection is made, and image data expansion equipment. Furthermore, device information data can use what the user set up arbitrarily.
[0082] As a storage for supplying a program code, a floppy disk, a hard disk, an optical disk, a magneto-optic disk, CD-ROM, CD-R, a magnetic tape, nonvolatile memory card, ROM, etc. can be used, for example.
[0083] Moreover, by performing the program code which the computer read, OS (operating system) which the function of the operation gestalt mentioned above is not only realized, but is working on a computer based on directions of the program code performs a part or all of actual processing, and when the function of the gestalt of operation mentioned above by the processing is realized, it is contained.
[0084] Furthermore, after the program code read from the storage is written in the memory with which the expansion unit connected to the expansion board inserted in the computer or the computer is equipped, based on directions of the program code, a part or all of processing that CPU with which the expansion board and expansion unit are equipped is actual is performed, and when the function of the operation form mentioned above by the processing is realized, it is contained.
[0085] When applying this invention to the above-mentioned storage, the program code corresponding to the flow chart (shown in drawing 11 or drawing 12) explained previously will be stored in the storage.

[Translation done.]

* NOTICES *

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1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is drawing showing the outline of the XML printer system in this operation gestalt.
[Drawing 2] The formatting server 202 is the block diagram of the XML print system in a back-end.
[Drawing 3] It is the block diagram of XML controller 201b in the XML printer 201.
[Drawing 4] It is the block diagram of the formatting server 202.
[Drawing 5] It is drawing showing an operator's order of the message at the time of reference printing between an XML printer, and a formatting server and a document server.
[Drawing 6] They are drawing (a) showing the example of the printing screen in a user, and drawing (b) of an example showing the composition of a job ticket.
[Drawing 7] It is drawing showing an example of the document changed into SVG from XHTML.
[Drawing 8] It is the ** type view showing the situation of reference printing.
[Drawing 9] It is the ** type view showing other gestalten of direct printing.
[Drawing 10] It is the flow chart for explaining the procedure of download of the set point to a device performed between a base system and a center system.
[Drawing 11] It is the flow chart of the procedure of an XML printer which received the job ticket from the user.
[Drawing 12] It is the flow chart of the procedure of the formatting server which received XML or the HTML document from the XML printer.
[Drawing 13] It is the block diagram of a general purpose computer usable as a formatting server.
[Drawing 14] It is the block diagram of an XML printer.

[Translation done.]

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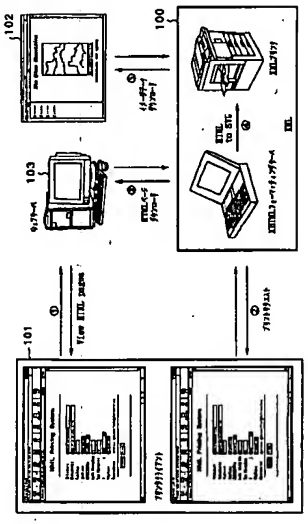
ＣＡ02
5Ｂ021 ＡＡ01 ＢＢ01 ＢＢ08 ＢＢ10 ＣＣ05
ＤＤ15

(54)【発明の名称】　プリンタシステム

(57)【要約】
【課題】ＸＭＬ文書をそのまま印刷させる。
【解決手段】プリントクライアント１０１からＸＭＬプリンタ１００ｂに対して文書のＵＲＬを指定することで、ドキュメントサーバ１０３で提供されているＨＴＭＬ文書を読み出させる。ＸＭＬプリンタ１００ｂは、フォーマッティングサーバ１００ａによりそれをＳＶＧ形式に変換させ、それを解釈して必要があればイメージをダウンロードし、それを文書に組み込んで印刷する。



【特許請求の範囲】

【請求項１】　ネットワークに接続されたプリンタシステムであって、
印刷指示データを受信すると、それが文書データのネットワーク上における場所を指定した場所データである場合、指定された場所から文書データを獲得する獲得手段と、
前記獲得手段により獲得した文書データを解釈する解釈手段と、
前記解釈手段により解釈された文書データに基づいてレンダリングし、印刷する印刷手段とを備えることを特徴とするプリンタシステム。

【請求項２】　印刷指示データを受信すると、それが文書データのネットワーク上における場所を指定した場所データであるか、文書データであるかを判別する判別手段を更に備え、
前記解釈手段は、印刷指示データが文書データである場合、その文書データを解釈することを特徴とする請求項１に記載のプリンタシステム。

【請求項３】　前記文書データは書式が不定の文書データであり、前記解釈手段は、前記文書データを解釈可能な形式に変換する変換手段を有し、該変換手段は、文書データの変換時に、書式情報を参照して印刷時の書式を確定することを特徴とする請求項１に記載のプリンタシステム。

【請求項４】　前記変換手段は、文書データの書式をあらかじめ定義したスタイルシートに従って、前記文書データの書式を確定することを特徴とする請求項３に記載のプリンタシステム。

【請求項５】　前記解釈手段は、前記文書データに埋め込むべきオブジェクトの指定を見いだすと、当該オブジェクトの指定に基づいて、指定されたオブジェクトを獲得し、前記文書データの指定箇所に埋め込むことを特徴とする請求項１乃至４のいずれか１項に記載のプリンタシステム。

【請求項６】　前記解釈手段は、獲得したオブジェクトを格納するキャッシュ手段を有し、前記オブジェクトの指定に基づいて指定されたオブジェクトを獲得する際に、まず前記キャッシュ手段を参照し、そこに格納されていればそのオブジェクトを前記文書データに埋め込み、格納されていなければ、指定された位置を参照してオブジェクトを獲得することを特徴とする請求項５に記載のプリンタシステム。

【請求項７】　符号化データを復号する復号手段を更に備えることを特徴とする請求項１に記載のプリンタシステム。

【請求項８】　前記印刷手段はカラー印刷機能を有し、該カラー印刷機能によりカラー印刷するために、前記文書データのカラーと、前記カラー印刷機能により出力するカラー情報とを整合するカラーマッチング手段を更に備えることを特徴とする請求項１に記載のプリンタシステム。

【請求項９】　ネットワークに接続されたプリンタシステムにおいて、
印刷指示データを受信すると、それが文書データのネットワーク上における場所を指定した場所データである場合、指定された場所から文書データを獲得する獲得工程と、
前記獲得工程により獲得した文書データを解釈する解釈工程と、
前記解釈工程により解釈された文書データに基づいてレンダリングし、印刷する印刷工程とを備えることを特徴とするプリンタシステムの制御方法。

【請求項１０】　印刷指示データを受信すると、それが文書データのネットワーク上における場所を指定した場所データであるか、文書データであるかを判別する判別工程を更に備え、
前記解釈工程は、印刷指示データが文書データである場合、その文書データを解釈することを特徴とする請求項９に記載のプリンタシステムの制御方法。

【請求項１１】　前記文書データは書式が不定の文書データであり、前記解釈工程は、前記文書データを解釈可能な形式に変換する変換工程を有し、該変換工程は、文書データの変換時に、書式情報を参照して印刷時の書式を確定することを特徴とする請求項１０に記載のプリンタシステムの制御方法。

【請求項１２】　前記変換工程は、文書データの書式をあらかじめ定義したスタイルシートに従って、前記文書データの書式を確定することを特徴とする請求項１１に記載のプリンタシステムの制御方法。

【請求項１３】　前記解釈工程は、前記文書データに埋め込むべきオブジェクトの指定を見いだすと、当該オブジェクトの指定に基づいて、指定されたオブジェクトを獲得し、前記文書データの指定箇所に埋め込むことを特徴とする請求項９乃至１２のいずれか１項に記載のプリンタシステムの制御方法。

【請求項１４】　前記解釈工程は、獲得したオブジェクトをキャッシュに格納し、前記オブジェクトの指定に基づいて指定されたオブジェクトを獲得する際に、まず前記キャッシュを参照し、そこに格納されていればそのオブジェクトを前記文書データに埋め込み、格納されていなければ、指定された位置を参照してオブジェクトを獲得することを特徴とする請求項１３に記載のプリンタシステムの制御方法。

【請求項１５】　所定言語で記述された文書データを処理可能なプリンタとネットワークとに接続されたフォーマット変換装置であって、
文書データを受信すると、その文書データを、当該文書に対して指定された書式情報を参照して前記プリンタが処理可能な形式に変換する変換手段と、

前記変換手段による変換に際して、前記プリンタの機能情報を獲得する獲得手段とを備えることを特徴とするフォーマット変換装置。

【請求項１６】　前記変換手段は、ＸＭＬまたはＨＴＭＬ形式の文書データを、ＳＶＧ形式の文書データに変換することを特徴とする請求項１５に記載のフォーマット変換装置。

【請求項１７】　文書データを処理可能な形式に変換するフォーマット変換装置とネットワークとに接続されたプリンタであって、

印刷指示データを受信すると、それが文書データのネットワーク上における場所を指定した場所データである場合、指定された場所から文書データを獲得する獲得手段と、

前記フォーマット変換装置に対して獲得した文書データを送信し、処理可能な形式に変換させる変換手段と、

前記変換手段により変換された文書データを解釈する解釈手段と、

前記解釈手段により解釈された文書データに基づいてレンダリングし、印刷する印刷手段とを備えることを特徴とするプリンタ。

【請求項１８】　前記解釈手段は、前記文書データに埋め込むべきオブジェクトの指定を見いだすと、当該オブジェクトの指定に基づいて、指定されたオブジェクトを獲得し、前記文書データの指定箇所に埋め込むことを特徴とする請求項１７に記載のプリンタ。

【請求項１９】　請求項１５又は１６に記載のフォーマット変換装置と、請求項１７又は１８に記載のプリンタとを組み合わせてなることを特徴とするプリンタシステム。

【請求項２０】　所定言語で記述された文書データを、プリンタで処理可能な形式に変換するためのコンピュータプログラムを格納するためのコンピュータ可読記憶媒体であって、前記コンピュータプログラムは、

文書データを受信すると、その文書データを、当該文書に対して指定された書式情報を参照して前記プリンタが処理可能な形式に変換する変換工程のコードと、

前記変換工程のコードによる変換に際して、前記プリンタの機能情報を獲得する獲得工程のコードとを含むことを特徴とするコンピュータ可読記憶媒体。

【請求項２１】　文書データを処理可能な形式に変換するフォーマット変換装置とネットワークとに接続されたプリンタを制御するコンピュータプログラムを格納するためのコンピュータ可読の記憶媒体であって、前記コンピュータプログラムは、

印刷指示データを受信すると、それが文書データのネットワーク上における場所を指定した場所データである場合、指定された場所から文書データを獲得する獲得工程のコードと、

前記フォーマット変換装置に対して獲得した文書データを送信し、処理可能な形式に変換させる変換工程のコードと、

前記変換工程のコードにより変換された文書データを解釈する解釈工程のコードと、

前記解釈工程のコードにより解釈された文書データに基づいてレンダリングする印刷工程のコードとを含むことを特徴とするコンピュータ可読記憶媒体。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、たとえばホストコンピュータで作成された文書データを印刷するためのプリンタシステムに関し、特に、文字や画像といったオブジェクトの論理構造を指定をすることで文書の体裁を定義するマークアップ言語により記述された文書をそのまま印刷するためのプリンタシステムに関する。

【０００２】

【従来の技術】近年、インターネットの普及により、多くの文書がＨＴＭＬと呼ばれるマークアップ言語で記述されてＷＷＷサーバ（ＨＴＴＰサーバ）により提供され、インターネットに接続した端末からアクセス可能になっている。ＨＴＭＬで記述された文書はウエブブラウザと呼ばれるアプリケーションにより読み込まれ、ウェブブラウザは文書中に埋め込まれたタグを解釈することで、文書や画像を端末画面上に配置・表示する。その際、文書中のオブジェクトは、オブジェクトそのものではなく、それがおかれた場所及びオブジェクトの識別子によって指定されている場合もある。そのような場合には、ウェブブラウザは指定された場所（ＵＲＬと呼ばれる記述子により記述される）にアクセスして、指定されたオブジェクトを読み、文書に合成して表示する。

【０００３】ホストコンピュータは、このＨＴＭＬ文書を印刷する際には、通常の文書と同様、ウエブブラウザにより形成された画像データ（オブジェクトの集合体である画像）を、オペレーティングシステムの関数を使用してプリンタに送出する。その際に、使用するプリンタに対応したプリンタドライバによって、画像データはプリンタにより解釈可能な形式に変換される。

【０００４】このように、ホストコンピュータが、ＨＴＭＬ文書を印刷するためには、必要なオブジェクトをすべて収集して表示形式に変換した上で、さらにプリンタで解釈可能な形式に変換するという工程を踏んでいた。

【０００５】一方、ＨＴＭＬを拡張したＸＭＬというマークアップ言語も普及しつつある。ＸＭＬは、文書の構造をＤＴＤ（文書型定義）という文書型定義ファイルで表すことで、表現方法の指定や文章中の文字列に意味を付加するような独自のタグを拡張することができる。このＸＭＬによってＨＴＭＬを定義したＸＨＴＭＬというマークアップ言語も使用されつつある。

【０００６】

【発明が解決しようとする課題】このように、ＨＴＭＬ

文書の印刷のためには、ホストコンピュータは、データの収集や変換といった多くの処理を実行しなければならず、負担が大きかった。

【０００７】また、ＸＭＬやＨＴＭＬ、ＸＨＴＭＬといったマークアップ言語は標準化が進められており、オペレーティングシステムやアプリケーションプログラムに関わらず、それらマークアップ言語で記述された文書であればその互換性が保障される体制が整いつつある。このようなきわめて互換性の高い、ハードウエアやオペレーティングシステム、アプリケーションから独立した言語であれば、プリンタが解釈可能な形式にホストコンピュータにより変換されなくとも、その言語そのものを解釈・印刷するプリンタもまた多くの異なる種類の環境下で使用可能である。このようなプリンタであれば、ますますホストコンピュータの負担を軽減することができる。

【０００８】本発明は上記従来例に鑑みて成されたもので、標準化された言語で記述された文書データをそのままの形式で解釈でき、印刷できるプリンタシステムを提供することを目的とする。

【０００９】さらに、文書中に埋め込まれたオブジェクトが、ＵＲＬやファイル名といった参照データであっても、それら参照データからオブジェクトを収集して文書を完成させて印刷させることができるプリンタシステムを提供することを目的とする。

【００１０】さらに、文書そのものではなく、参照データを受け取ることで印刷が可能なプリンタシステムを提供することを目的とする。

【００１１】さらに、ひとつの文書について、簡単にレイアウトを変更して印刷することが可能なプリンタシステムを提供することを目的とする。

【００１２】

【課題を解決するための手段】上記目的を達成するために本発明は次のような構成からなる。

【００１３】ネットワークに接続されたプリンタシステムであって、印刷指示データを受信すると、それが文書データのネットワーク上における場所を指定した場所データである場合、指定された場所から文書データを獲得する獲得手段と、前記獲得手段により獲得した文書データを解釈する解釈手段と、前記解釈手段により解釈された文書データに基づいてレンダリングし、印刷する印刷手段とを備える。

【００１４】また好ましくは、印刷指示データを受信すると、それが文書データのネットワーク上における場所を指定した場所データであるか、文書データであるかを判別する判別手段を更に備え、前記解釈手段は、印刷指示データが文書データである場合、その文書データを解釈する。

【００１５】また好ましくは、前記文書データは書式が不定の文書データであり、前記解釈手段は、前記文書データを解釈可能な形式に変換する変換手段を有し、該変換手段は、文書データの変換時に、書式情報を参照して印刷時の書式を確定する。

【００１６】また好ましくは、前記変換手段は、文書データの書式をあらかじめ定義したスタイルシートに従って、前記文書データの書式を確定する。

【００１７】また好ましくは、前記解釈手段は、前記文書データに埋め込むべきオブジェクトの指定を見いだすと、当該オブジェクトの指定に基づいて指定されたオブジェクトを獲得し、前記文書データの指定箇所に埋め込む。

【００１８】また好ましくは、前記解釈手段は、獲得したオブジェクトを格納するキャッシュ手段を有し、前記オブジェクトの指定に基づいて指定されたオブジェクトを獲得する際に、まず前記キャッシュ手段を参照し、そこに格納されていればそのオブジェクトを前記文書データに埋め込み、格納されていなければ、指定された位置を参照してオブジェクトを獲得する。

【００１９】また好ましくは、符号化データを復号する復号手段を更に備える。

【００２０】また好ましくは、前記印刷手段はカラー印刷機能を有し、該カラー印刷機能によりカラー印刷するために、前記文書データのカラーと、前記カラー印刷機能により出力するカラー情報とを整合するカラーマッチング手段を更に備える。

【００２１】あるいは、所定言語で記述された文書データを処理可能なプリンタとネットワークとに接続されたフォーマット変換装置であって、文書データを受信すると、その文書データを、当該文書に対して指定された書式情報を参照して前記プリンタが処理可能な形式に変換する変換手段と、前記変換手段による変換に際して、前記プリンタの機能情報を獲得する獲得手段とを備える。

【００２２】また好ましくは、前記変換手段は、ＸＭＬまたはＨＴＭＬ形式の文書データを、ＳＶＧ形式の文書データに変換する。

【００２３】あるいは、文書データを処理可能な形式に変換するフォーマット変換装置とネットワークとに接続されたプリンタであって、印刷指示データを受信すると、それが文書データのネットワーク上における場所を指定した場所データである場合、指定された場所から文書データを獲得する獲得手段と、前記フォーマット変換装置に対して獲得した文書データを送信し、処理可能な形式に変換させる変換手段と、前記変換手段により変換された文書データを解釈する解釈手段と、前記解釈手段により解釈された文書データに基づいてレンダリングし、印刷する印刷手段とを備える。

【００２４】さらに好ましくは、前記解釈手段は、前記文書データに埋め込むべきオブジェクトの指定を見いだすと、当該オブジェクトの指定に基づいて、指定されたオブジェクトを獲得し、前記文書データの指定箇所に埋

め込む。

〔発明の詳細な説明〕〔第１の実施の形態〕本発明の実施の形態であるＸＭＬプリンタシステムについて以下に図面を参照して説明する。

【００２５】図１は、本実施形態におけるＸＭＬプリンタシステムの概要を示す図である。プリンタのクライアント１０１は、たとえばインターネットに接続して利用者が指定したロケーションのＨＴＭＬページを獲得し（１）、ジョブチケットと呼ばれるプリント要求を、フォーマッティングサーバ１００ａとＸＭＬプリンタ１００ｂとを有するＸＭＬプリントシステムへ発行する（２）。この要求にはＨＴＭＬ文書そのものが含まれていても良いし、文書そのものの代わりに、文書の在処を指定するＵＲＬが含まれるものであってもよい。また、ＸＭＬプリントシステム１００は、フォーマッティングサーバがバックエンドにあっても良いし、フロントエンドにあっても良い。いずれにしてもフロントエンドにある方の装置がジョブチケットの受け手となるが、それぞれの果たす機能そのものは変わらない。ここではフォーマッティングサーバ１００ａがフロントエンドにあるものとして説明する。

【００２６】ジョブチケットに文書そのものが含まれる場合、すなわちダイレクト印刷の場合には、ＸＭＬプリンタ１００ｂは、その文書をフォーマッティングサーバに対して送信してＨＴＭＬ文書からＳＶＧ文書に変換させる。ＳＶＧデータとは、ＨＴＭＬと同様にタグを用いたＳＶＧと呼ばれる言語で記述したデータであり、ＳＶＧはＸＭＬを使用して定義されている。またＳＶＧは１ページごとの文書の体裁を定義する機能を有している。図７は、ＸＨＴＭＬからＳＶＧへと変換された文書の一例を示す図である。ＸＨＴＭＬ文書はレイアウトが固定化されておらず、表示領域を文書７０１の状態から文書７０３の状態に変えると、それにともなってレイアウトが変わってしまう。ところが別途指定されたレイアウト情報を参照してＳＶＧへと変換すれば、文書７０２のように、出力レイアウトを確定できる。文書７０３は、ＳＶＧによってたとえば、文字の間隔や、画像のページ中における座標位置などが記述されている。

【００２７】そしてＸＭＬプリンタ１００ｂが、フォーマッティングサーバ１００ａからＳＶＧ形式のデータを受信すると（４）、ＸＭＬプリンタ１００ｂの有するＳＶＧインタプリタにそのデータを解釈させて、印刷する。

【００２８】一方、ジョブチケットに印刷すべきページのＵＲＬが含まれている場合、すなわちリファレンス印刷の場合には、フォーマッティングサーバ１００ａは、受信したジョブチケットを解析して、指定されたＵＲＬに基づいてウエブサーバ１０３からＨＴＭＬページを取得する（３）。そして、ＨＴＭＬ形式のデータをＳＶＧ形式のデータに変換して、ＳＶＧ形式のデータをＸＭＬプリンタ１００ｂに送信する（４）。以下は、ダイレクトプリンタの場合と同様の手順となる。

【００２９】また、ＸＭＬプリンタ１００ｂは、ＳＶＧデータの中に、オブジェクトを参照するタグが埋め込まれていた場合には、その参照先からオブジェクト、たとえばイメージデータをダウンロードして（５）、文書中の指定位置（タグの位置）にイメージを埋め込み、それを印刷する。この場合の参照先は、単なるファイル名の場合もあれば、ディレクトリのパスが記述されている場合も、ＵＲＬの場合もある。それぞれの場合に応じて、参照先を認定して参照する。

【００３０】図６は、ユーザにおける印刷画面の例を示す図（ａ）と図（ｂ）である。図（ａ）は、ホストコンピュータのウエブブラウザにおける印刷画面の例であり、図（ｂ）は、携帯端末における印刷画面の例である。印刷の際には、ホストコンピュータ（ウェブブラウザ）或い携帯端末は、印刷画面が定義されたＨＴＭＬページをＸＭＬプリンタから取り込んで、画面表示する。ユーザは、その画面を見ながら、必要な箇所に所望の値を入力する。すると、ホストコンピュータは、入力された値をジョブチケットに付加して、ＸＭＬプリンタに送信する。入力欄としては、プリンタアドレス、印刷すべき文書のＵＲＬ、部数、用紙サイズ、用紙方向、マージン、使用するスタイルシート、オペレーション（プレビュー，ダイレクト印刷，リファレンス印刷の指定）等を指定できる。

【００３１】オペレーションとして、ダイレクト印刷が指定されると、指定されたＵＲＬから読み出された文書がジョブチケットと共にＸＭＬプリンタに送信される。ジョブチケットには、部数、用紙サイズ、用紙方向、マージン、使用するスタイルシート、オペレーション（プレビュー，ダイレクト印刷，リファレンス印刷の指定）の値がそれぞれ含まれている。

【００３２】一方、リファレンス印刷が指定されると、指定された文書のＵＲＬがジョブチケットとしてプリンタに送信される。この場合も、ジョブチケットには、印刷すべき文書のＵＲＬ、部数、用紙サイズ、用紙方向、マージン、使用するスタイルシート、オペレーション（プレビュー，ダイレクト印刷，リファレンス印刷の指定）の値がそれぞれ含まれている。

【００３３】図２は、フォーマッティングサーバ２０２がバックエンドにある場合のＸＭＬプリントシステムのブロック図である。ユーザのホストコンピュータ或いは携帯端末２０４はＨＴＴＰクライアントであり、たとえばウエブブラウザプログラム等が実行されている。ＸＭＬプリンタ２０１は、フォーマッティングサーバ２０２の有するＨＴＴＰサーバ２０２ａやドキュメントサーバ２０３の有するＨＴＴＰサーバ１０３ａとデータを交換するためのＨＴＴＰクライアント２０１ａと、プリンタを制御するための、後述するＸＭＬコントローラ２０１ｂとを有する。ドキュメントサーバ２０３は、インターネットに接続された通常のＨＴＴＰサーバ（ＷＷＷサーバ）であればよい。このドキュメントサーバから提供される文書を、ＸＭＬプリンタ２０１により印刷する。

【００３４】フォーマッティングサーバ２０２は、ＨＴＴＰサーバ２０２ａとＸＨＴＭＬフォーマッタ２０２ｂとを含む。ＸＨＴＭＬフォーマッタ２０２ｂは、後述するように、ＨＴＭＬ形式のデータやＸＭＬ形式のデータをＸＨＴＭＬ形式に変換し、それをＳＶＧ形式に変換する機能を有する。

【００３５】図１３はフォーマッティングサーバとして使用可能な汎用コンピュータのブロック図であり、図１４は、ＸＭＬプリンタのブロック図である。

【００３６】図１３において、コンピュータ３０００は、ＲＯＭ３のプログラム用ＲＯＭに記憶された処理プログラム等に基づいて後述するフォーマッティングサーバとしての機能を遂行するためのＣＰＵ１を備え、システムバス４に接続される各デバイスをＣＰＵ１が統括的に制御する。ＲＡＭ２は、ＣＰＵ１の主メモリ、ワークエリア等として機能する。キーボードコントローラ（ＫＢＣ）５は、キーボード９や不図示のポインティングデバイスからのキー入力を制御する。ＣＲＴコントローラ（ＣＲＴＣ）６は、ＣＲＴディスプレイ１０の表示を制御する。ディスクコントローラ（ＤＫＣ）７は、ブートプログラム、種々のアプリケーション、フォントデータ、ユーザファイル、編集ファイル等を記憶するハードディスク（ＨＤ）、フロッピー（登録商標）ディスク（ＦＤ）等の外部メモリ１１とのアクセスを制御する。ＬＡＮ制御部８はＬＡＮに制御されるが、フォーマッティングサーバはＬＡＮに限らず、公衆あるいは専用電話回線に接続するインターフェースを備える。なお、ＣＰＵ１は、例えばＲＡＭ２上に設定された表示情報ＲＡＭへのアウトラインフォントの展開（ラスタライズ）処理を実行し、ＣＲＴ１０上でのＷＹＳＩＷＹＧ（表示内容と印刷内容とを一致させる機能）を可能としている。また、ＣＰＵ１はＣＲＴ１０上の不図示のマウスカーソル等で指示されたコマンドに基づいて登録された種々のウィンドウを開き、種々のデータ処理を実行する。

【００３７】図１４においては、プリンタＣＰＵ１２は、ＲＯＭ１３のプログラム用ＲＯＭに記憶された制御プログラム等に記憶された制御プログラム等に基づいてシステムバス１５に接続される各種のデバイスとのアクセスを統括的に制御し、印刷部Ｉ／Ｆ１６を介して接続される印刷部（プリンタエンジン）１７に出力情報としての画像信号を出力する。ＣＰＵ１２は双方向Ｉ／Ｆ２１を介してホストコンピュータとの通信処理が可能となっており、プリンタ内の情報等をホストコンピュータ３０００に通知可能に構成されている。ＲＡＭ１９はＣＰＵ２１の主メモリ、ワークエリア等として機能するＲＡＭである。入力部１８は、ＬＡＮや専用回線、公衆回線等を介してコンピュータ３０００と接続され、文書データやＵＲＬ等をホストコンピュータ３０００に通知可能に構成されている。メモリコントローラ（ＭＣ）２０は、ブートプログラム、種々のアプリケーション、フォントデータ、ユーザファイル、後述するフローチャートの手順のプログラムコード記憶するハードディスク（ＨＤ）、フロッピーディスク（ＦＤ）等の外部メモリ１４とのアクセスを制御する。操作部１０１２は、表示パネルやキーボードを含んでおり、オペレータへの情報の提供や、オペレータからの指示の入力を行わせる。

【００３８】＜ＸＭＬコントローラ＞図３はＸＭＬプリンタ２０１におけるＸＭＬコントローラ２０１ｂのブロック図である。

【００３９】図において、ジョブチケットインタプリタ３０１は、発行されたジョブチケットに添付されたＸＭＬデータの分析や、用紙サイズ，排紙ビン，レイアウト等の文書属性の設定などのほか、リファレンス印刷の場合には後述するドキュメントコレクタ３０２の起動を行う。

【００４０】ドキュメントコレクタ３０２は、ＨＴＴＰクライアントとＩＰＰサーバとを含む。ＨＴＴＰクライアントはＴＣＰ／ＩＰネットワークに接続されており、指定されたＵＲＬのリソースを取得する。また、サーバにおける変換に必要な情報である用紙サイズ等を通知する。さらに、ドキュメントファイルマネージャ３０３を起動して、文書中のエラーの管理や、文書の階層構造、キャッシュの管理等を行わせる。

【００４１】ドキュメントパーサ３０４は、ＳＶＧ形式のデータ構造の分析と埋め込まれたデータ（例えば、イメージデータ）の取り出しを行う。また、機能ごとの各処理モジュールへの負荷の分散や、エラーイベント発生時のジョブ終了処理を行い、さらに、データがＵＲＬの際には、ドキュメントコレクタの起動も行う。

【００４２】ＳＶＧインタプリタ３０５は、ＳＶＧ形式のデータを解釈し、指定されたオブジェクトを指定されたように配置する機能を有する。そのために、オブジェクトが配置される座標などを、論理値からデバイス値へと変換するなどの処理を行う。インタプリタとしては他にＣＳＳインタプリタも備えている。

【００４３】なお、プリンタがカラー印刷機能を有する場合には、ドキュメントデータで指定された色をプリンタの色に合わせるために、いわゆるカラーマッチング機能をＳＶＧインタプリタは有している。

【００４４】ＸＭＬグラフィックライブラリ３０７は、レンダラ３０８には不足した描画機能を提供し、レンダラ依存部分を吸収する機能を有する。ＸＭＬグラフィックライブラリ３０７によって、レンダラ３０８によるレンダリング処理が可能な形式のデータが生成される。

【００４５】レンダラ３０８は、ビットマップ形式のデータを生成して、プリンタエンジン３０９へ送出し、プ

リントさせる。

【0046】デコーダ310は、JPEGやGIFといった圧縮イメージを復号する。

【0047】キャパビリティデスクリプタ311は、フォーマッティングサーバに対して、プリンタの機能（画像処理機能など）や能力（解像度など）等に関する情報を送信する。

【0048】以上の構成によって、ジョブチケットを解釈し、必要な文書やイメージ等のリソース（HTMLあるいはXML形式）を獲得して、必要に応じてフォーマッティングサーバによりSVG形式へと変換を行わせ、変換されたデータをレンダリングし、それを印刷することができる。

【0049】<フォーマッティングサーバの構成>図4は、フォーマッティングサーバ202のブロック図である。

【0050】フォーマッティングサーバ202において、ドキュメントリクエストレシーバ405は、ドキュメントコレクタ302から送られる用紙サイズ等のフォーマッティングに必要な情報や、リファレンス印刷であればドキュメントのURLを、ダイレクト印刷であればXMLやHTML形式のデータを受信する。また、ドキュメントリクエストレシーバ405は、ドキュメントコレクタ302に対して、XMLやHTMLから変換された、SVGのタグセットを利用して記述されたドキュメントファイルや画像データファイルを送信する。

【0051】トランスレータ402は、ファイルシステム403から必要に応じてスタイルシート等を読み込んで、HTMLやXMLデータをXHTML形式に変換し、そのデータはさらにフォーマッタ401によって、SVG形式に変換される。XHTML形式は、先に説明したようにXMLによって定義されたHTMLであることから、HTMLからの変換も、XMLからの変換も比較的容易である。

【0052】また、SVGもXMLによって定義されている形式であるが、この変換は、キャパビリティレジスタ404により受信されたプリンタの機能や能力等、またドキュメントリクエストレシーバ405により受信したサイズ情報等を参照して行われる。たとえば、XHTMLには印刷の際のページなる概念がないために、SVGへの変換の際にはページ区切りをしなければならない。このとき、区切り位置の決定のためなどに用紙サイズや、解像度などの情報が参照される。

【0053】このようにして変換されたSVG形式のデータは、ドキュメントリクエストレシーバ405に渡されて、そこからXMLプリンタのXMLコントローラ101bに送信される。

【0054】こうしてフォーマッティングサーバ202により、HTMLあるいはXMLで記述されたデータはSVGに変換され、XMLプリンタ201に入力される。

【0055】XMLプリンタ201に入力されたSVGのデータは、先に説明したとおり、ドキュメントパーサ304で分析され、埋込みオブジェクトがあればそれを読み込んで文書に埋め込み、指定された書式に整形された上で印刷出力される。

【0056】<印刷手順>図5は、XMLプリンタとフォーマッティングサーバ、ドキュメントサーバの間における、リファレンス印刷時のメッセージの交換手順を示している。

【0057】まず、ジョブチケットがXMLプリンタに対して発行されると、XMLプリンタは指定された文書のURLに従って、ドキュメントサーバからの文書の読み出しを行い（502）、指定されたHTMLドキュメントを獲得する（504）。XMLプリンタはいったんそれを格納した後、フォーマッティングサーバに対して、ドキュメントサーバから獲得したHTMLドキュメントを送信し、SVG形式に変換させる（506）。フォーマッティングサーバは、変換時に必要となる用紙サイズなどの情報や、プリンタの性能に関するたとえば解像度などの情報を、XMLプリンタに対して要求し（508）、獲得する（510）。

【0058】フォーマッティングサーバはそれらの情報を参照してHTMLドキュメントをSVGドキュメントに変換し、XMLプリンタに返送する（512）。

【0059】XMLプリンタは、受信したSVGドキュメントを解析して、埋め込まれたURLがあれば、それによって指定されるオブジェクトを獲得すべく、ドキュメントサーバにアクセスし（514）、オブジェクトを獲得する（516）。

【0060】上記シーケンスにおいて、XMLプリンタ及びフォーマッティングサーバそれぞれの手順は次のようになる。図11はユーザからジョブチケットを受信したXMLプリンタの処理手順のフローチャートを示し、図12は、XMLプリンタからXMLあるいはHTMLドキュメントを受信したフォーマッティングサーバの処理手順のフローチャートを示している。

【0061】図11において、ジョブチケットがXMLプリンタに対して発行されると、XMLプリンタはそれを受信し、指定されたオペレーションがリファレンス印刷であるか、ダイレクト印刷であるか判定する（ステップS1100）。リファレンス印刷であれば、HTTPクライアント機能を用いて、URLで指定されたドキュメントをドキュメントサーバから読み込む（ステップS1101）。なお、このとき、まずキャッシュを参照して、キャッシュされている文書やオブジェクトは、キャッシュから読み出す。

【0062】ドキュメントが獲得できた場合には、リファレンス印刷の場合には獲得したHTML文書を、ダイレクト印刷の場合には、ジョブチケット共に受信したXML文書あるいはHTML文書を、フォーマッティングサーバに送信する（ステップS1102）。

【0063】この後、フォーマッティングサーバとの間で、必要に応じてプリンタキャパビリティ情報の交換が行われた後、フォーマッティングサーバからSVGドキュメントを受信する（ステップS1103）。そして、そのドキュメントを分析し（ステップS1104）、埋込みオブジェクトがあるか判定して（ステップS1105）、オブジェクトがあれば、そのオブジェクトがHTMLドキュメントまたはXMLドキュメントのいずれかであるか、あるいはHTMLドキュメントやXMLドキュメントではない画像等であるかが判定される（ステップS1107）。何れでもない場合、たとえばビットマップ画像やJPEG、GIF画像等であれば、そのオブジェクトをURLに基づいて取得し、再び埋込みオブジェクトの判定を繰り返す（ステップS1105）。このとき、取得した文書やオブジェクトは、ハードディスク等のキャッシュ領域キャッシュしておき、ステップS1001において参照する。

【0064】埋込みオブジェクトの処理を終えたなら、そのSVGドキュメントをレンダリングしてビットマップ化し、プリンタエンジンから印刷させる（ステップS1106）。

【0065】図12においては、まず、フォーマッティングサーバは、XMLプリンタからXMLあるいはHTMLドキュメントを受信すると、プリンタキャパビリティ情報をXMLプリンタのコントローラに要求し、取得する（ステップS1201）。そして受信したHTMLドキュメントをXHTMLドキュメントに変換する（ステップS1202）。この際、ジョブチケットで指定されたスタイルシートを参照し、そのスタイルシートで定義された文書の書式に、HTMLドキュメントをはめ込んで、新たな形式のXHTMLドキュメントとする。スタイルシートでは、たとえば文字の書体やサイズ、段落分けの仕方、画像のレイアウト等が定義される。

【0066】いったんXHTMLに変換されたドキュメントは、ステップS1201で取得したプリンタの機能や性能を参照してSVGドキュメントに変換される（ステップS1203）。

【0067】以上のようにして、本来表示されるべきものとして定義されているHTMLドキュメントを、スタイルシートやプリンタキャパビリティ情報を参照することで、印刷されるページ単位のSVGドキュメントに変換することができる。

【0068】このように、HTMLやXHTMLで記述された文書を、XMLで定義されたSVG形式に変換することで、そのままプリンタによって印刷可能となる。このシステムでは、従来の印刷システムのように、ホストコンピュータによって文書を完成させ、その文書をプリンタで解釈可能な形式に変換しておく必要がない。このシステムでは、文書は、その中に埋め込むべきオブジェクトが、URLやファイル名といった参照データであっても、プリンタが、それら参照データからオブジェクトを収集して文書を完成させ印刷させることができる。

【0069】そのため、従来のプリンタドライバが不要となり、印刷に際しての、ホストコンピュータにおける出力処理がなくなり、ホストの負荷が軽減される。

【0070】また、文書そのものをプリンタに渡す必要すらなく、URL等の参照データをプリンタに渡すことでリファレンス印刷を行わせることができる。

【0071】さらに埋め込まれるオブジェクトが文書から独立しているために、そのオブジェクトを変える場合でも文書全体の編集し直しなどが不要であり、オブジェクトを入れ替えておくだけで済む。そのために、オブジェクトが画像であれば、表示と印刷とで異なる解像度の画像を用意することなどもできる。

【0072】さらに、文書やオブジェクトをキャッシュしておくことで、キャッシュに格納してある限りは通信を介してオブジェクトの取得をおこなわずに済む。

【0073】さらに、スタイルシートを利用していることで、ひとつの文書であっても、スタイルシートを変えることでレイアウトを変更して印刷することが可能である。

【0074】さらに、JPEGやGIFといった符号化データを復号する機能をプリンタに内蔵するために、ホストコンピュータにおける負荷を軽減できる。

【0075】<印刷手順のバリエーション>図8は、上記のような構成により行なわれるリファレンス印刷の様子を示す模式図である。図8においては、ジョブチケットがXMLプリンタに送信されると（1）、XMLプリンタはそれをドキュメントサーバ兼フォーマッティングサーバに転送し（2）、ドキュメントサーバ兼フォーマッティングサーバは受信したURLからドキュメントの本体を獲得する（3）。ドキュメントサーバ兼フォーマッティングサーバがそのドキュメントを受信すると、SVG形式に変換して（4）、XMLプリンタに送信して印刷させる（5）。

【0076】上述したシステムでは、XMLプリンタが文書の獲得を行っていたが、このように、ドキュメントサーバ兼フォーマッティングサーバに文書獲得及びSVG形式への変換の処理を行わせ、プリンタはジョブチケットの受信と印刷を行うように構成することもできる。このシステム構成においては、プリンタはフォーマッティングサーバからSVG文書が入力されるのを待って印刷するだけでよい。図11、図12の処理はすべてフォーマッティングサーバにより行われる。

【0077】図9はダイレクト印刷の他の形態を示す模式図である。XML形式のドキュメントがワードプロセッサなどから出力され、その文書をユーザが端末で受信すると、ユーザはその文書に書式等の指定を追加してサ

15 16

ーバ（図９ではフォーマッティングサーバをかねる）に転送する。これがジョブチケットとなる（１）。サーバはそれをＸＭＬプリンタに転送し（２）、ＸＭＬプリンタはフォーマッティングサーバに送信してＳＶＧ形式に変換させる（３）。フォーマッティングサーバはＳＶＧに変換した文書をＸＭＬプリンタに送信して印刷させる（４）。また、ユーザ端末は、ＸＭＬ形式のドキュメントを電子メールに添付して、サーバに送信してもよい。サーバは、その電子メールを受信して、添付されたドキュメントをＳＶＧ形式のデータに変換して、ＸＭＬプリンタに送信する。

【００７８】以上のように、フォーマッティングサーバとＸＭＬプリンタとの機能分担が変わることはあっても、本実施例で示したようなシステムとしての機能や効果にかわるところはない。

【００７９】［その他の実施の形態］なお、本発明の目的は、前述した実施形態の機能を実現するソフトウェアのプログラムコードを記録した記憶媒体を、システムあるいは装置に供給し、そのシステムあるいは装置のコンピュータ（またはＣＰＵやＭＰＵ）が記憶媒体に格納されたプログラムコードを読み出し実行することによっても達成される。

【００８０】この場合、記憶媒体から読み出されたプログラムコード自体が本発明の新規な機能を実現することになり、そのプログラムコードに記憶した記憶媒体は本発明を構成することになる。

【００８１】また、デバイス情報データは、画像処理装置及び画像データ展開装置に内蔵されているＨＤＤ、外部接続されている記憶媒体、画像データ展開装置からアクセス可能なサーバ等に保持されていても構わない。さらに、デバイス情報データはユーザが任意に設定したものを使用することが可能であっても構わない。

【００８２】プログラムコードを供給するための記憶媒体としては、例えば、フロッピーディスク、ハードディスク、光ディスク、光磁気ディスク、ＣＤ－ＲＯＭ、ＣＤ－Ｒ、磁気テープ、不揮発性のメモリカード、ＲＯＭなどを用いることができる。

【００８３】また、コンピュータが読み出したプログラムコードを実行することにより、前述した実施形態の機能が実現されるだけでなく、そのプログラムコードの指示に基づき、コンピュータ上で稼動しているＯＳ（オペレーティングシステム）などが、実際の処理の一部または全部を行い、その処理によって前述した実施の形態の機能が実現される場合も含まれる。

【００８４】さらに、記憶媒体から読み出されたプログラムコードが、コンピュータに挿入された機能拡張ボードやコンピュータに接続された機能拡張ユニットに備わるメモリに書き込まれた後、そのプログラムコードの指示に基づき、その機能拡張ボードや機能拡張ユニットに備わるＣＰＵなどが実際の処理の一部または全部を行い、その処理によって前述した実施形態の機能が実現される場合も含まれる。

【００８５】本発明を上記記憶媒体に適用する場合、その記憶媒体には、先に説明した（図１１乃至図１２に示す）フローチャートに対応するプログラムコードが格納されることになる。

【００８６】

【発明の効果】以上説明したように本発明によれば、標準化された言語で記述された文書データをそのままの形式で解釈でき、印刷できるプリンタシステムが実現できる。

【００８７】さらに、文書中に埋め込まれたオブジェクトが、ＵＲＬやファイル名といった参照データであっても、それら参照データからオブジェクトを収集して文書を完成させて印刷させることができる。

【００８８】さらに、文書そのものではなく、参照データを受け取ることで印刷が可能である。

【００８９】さらに、ひとつの文書について、簡単にレイアウトを変更して印刷することが可能である。

【図面の簡単な説明】

【図１】本実施形態におけるＸＭＬプリンタシステムの概要を示す図である。

【図２】フォーマッティングサーバ２０２がバックエンドにあるＸＭＬプリントシステムのブロック図である。

【図３】ＸＭＬプリンタ２０１におけるＸＭＬコントローラ２０１ｂのブロック図である。

【図４】フォーマッティングサーバ２０２のブロック図である。

【図５】ＸＭＬプリンタとフォーマッティングサーバ、ドキュメントサーバの間における、リファレンス印刷時のメッセージの交換手順を示す図である。

【図６】ユーザにおける印刷画面の例を示す図（ａ）と、ジョブチケットの構成を示す一例の図（ｂ）である。

【図７】ＸＨＴＭＬからＳＶＧへと変換された文書の一例を示す図である。

【図８】リファレンス印刷の様子を示す模式図である。

【図９】ダイレクト印刷の他の形態を示す模式図である。

【図１０】拠点システムとセンタシステムとの間で行われる、デバイスへの設定値のダウンロードの手順を説明するためのフローチャートである。

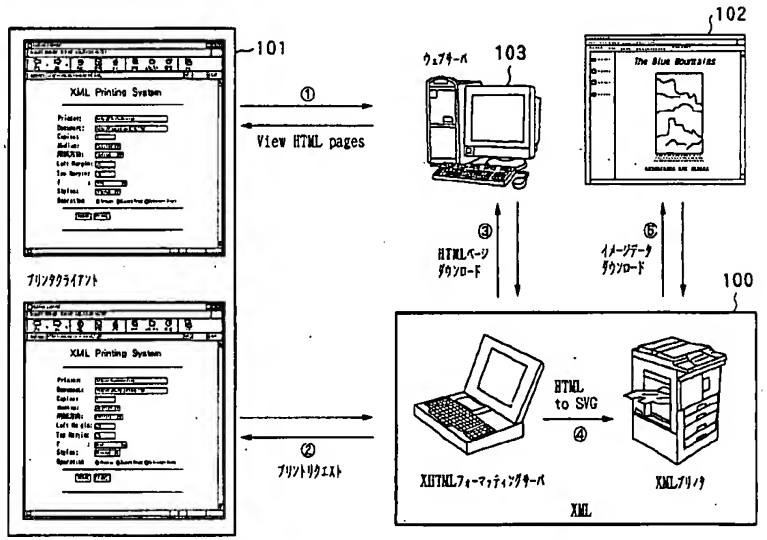
【図１１】ユーザからジョブチケットを受信したＸＭＬプリンタの処理手順のフローチャートである。

【図１２】ＸＭＬプリンタからＸＭＬあるいはＨＴＭＬドキュメントを受信したフォーマッティングサーバの処理手順のフローチャートである。

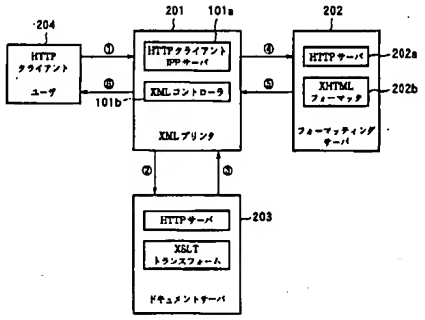
【図１３】フォーマッティングサーバとして使用可能な汎用コンピュータのブロック図である。

【図１４】ＸＭＬプリンタのブロック図である。

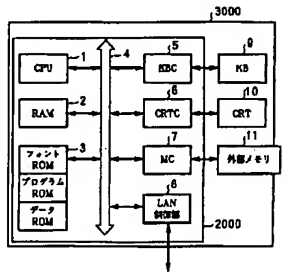
【図１】



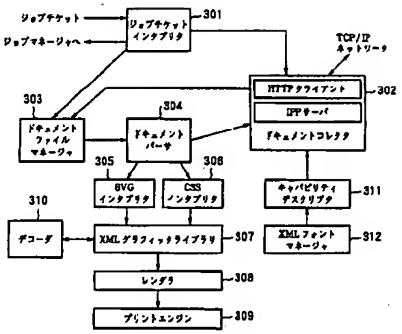
【図２】



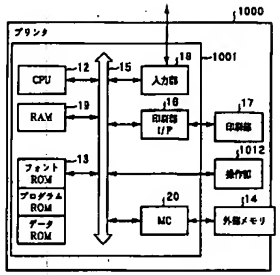
【図１３】



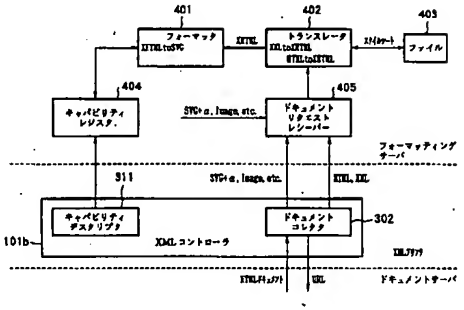
【図３】



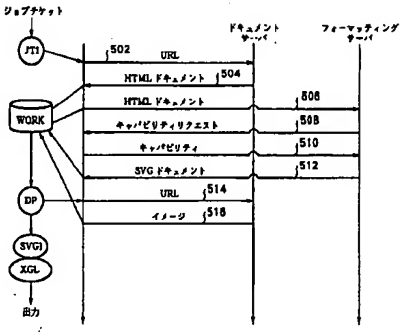
【図１４】



【図４】

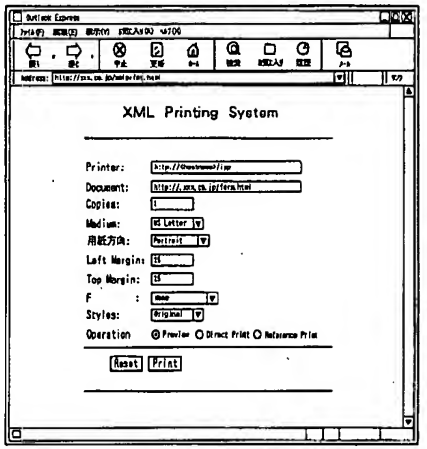


【図５】

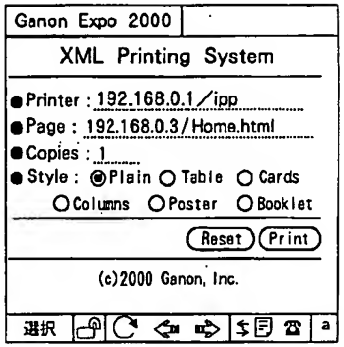


【図６】

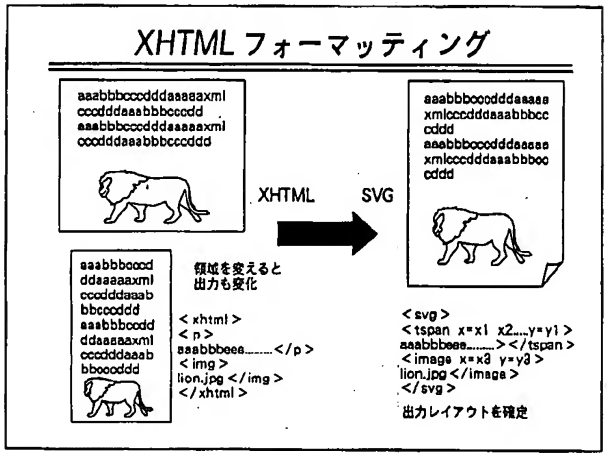
(a)



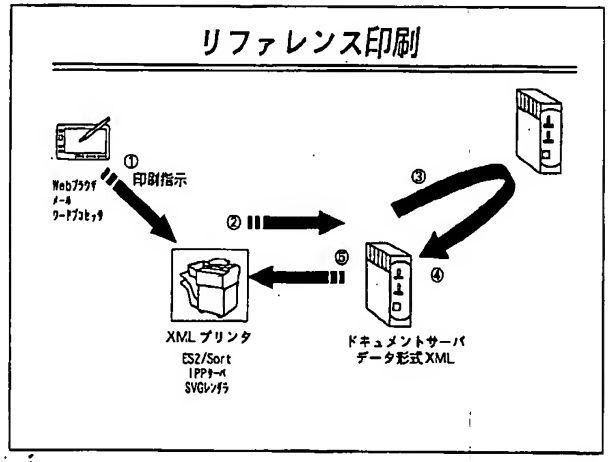
(b)



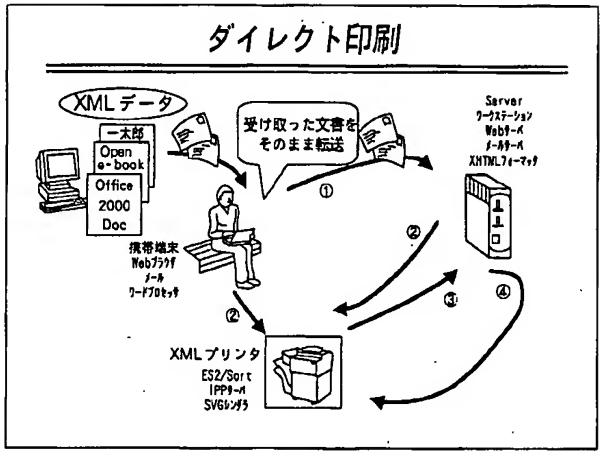
【図７】


XHTMLフォーマッティング
aaabbbccccdddaaaaaxml
ccccdddaaabbbccccdd
aaabbbccccdddaaaaaxml
ccccdddaaabbbccccddd
XHTML
SVG
aaabbbccccd
ddaaaaaxml
ccccdddaaab
bbccccddd
aaabbbccccd
ddaaaaaxml
ccccdddaaab
bbccccddd
領域を変えると
出力も変化
< xhtml >
< p >
aaabbbeee.....</ p >
< img >
lion.jpg </ img >
</ xhtml >
aaabbbccccdddaaaaa
xmlccccdddaaabbbcc
cddd
aaabbbccccdddaaaaa
xmlccccdddaaabbbcc
cddd
< svg >
< tspan x=x1 x2....y=y1 >
aaabbbeee.....></tspan >
< image x=x3 y=y3 >
lion.jpg</image >
</ svg >
出力レイアウトを確定

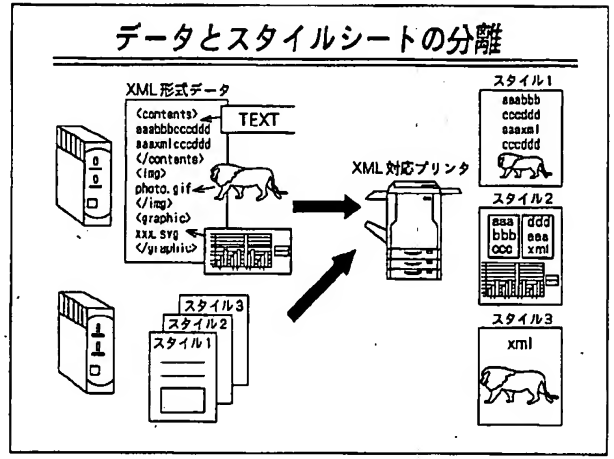
【図８】


リファレンス印刷
①
印刷指示
Webブラウザ
メール
ワードプロセッサ
②
③
④
⑤
XML プリンタ
ES2/Sort
IPPサーバ
SVGレンダラ
ドキュメントサーバ
データ形式XML

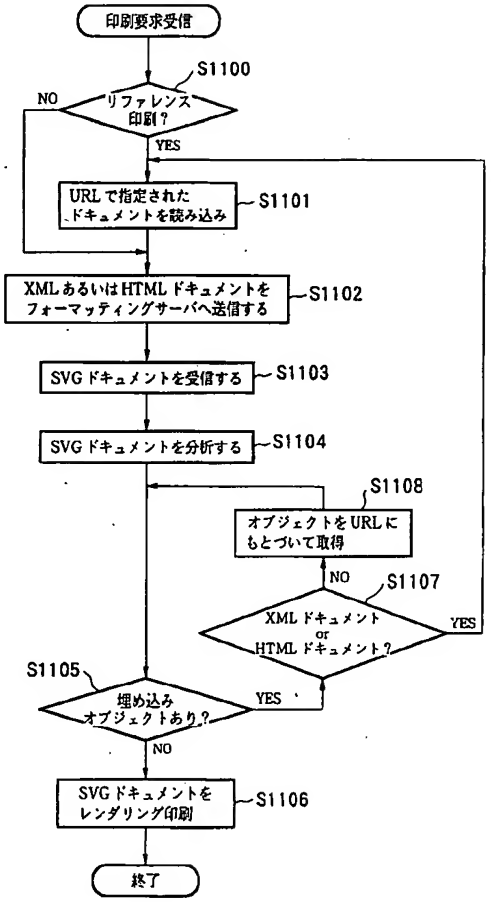
【図９】


ダイレクト印刷
XMLデータ
一太郎
Open e-book
Office 2000 Doc
受け取った文書を
そのまま転送
Server
ワークステーション
Webサーバ
メールサーバ
XHTMLフォーマッタ
携帯端末
Webブラウザ
メール
ワードプロセッサ
①
②
③
④
XMLプリンタ
ES2/Sort
IPPサーバ
SVGレンダラ

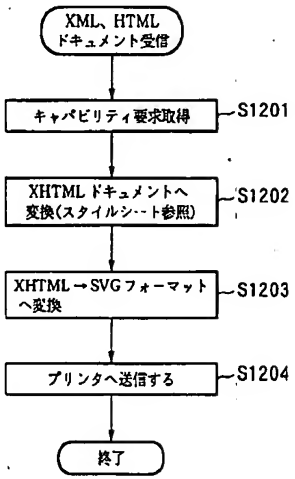
【図10】


データとスタイルシートの分離
XML形式データ
TEXT
XML対応プリンタ
スタイル1
スタイル2
スタイル3
xml

【図11】


印刷要求受信
S1100
リファレンス印刷?
NO
YES
URLで指定されたドキュメントを読み込み
S1101
XMLあるいはHTMLドキュメントをフォーマッティングサーバへ送信する
S1102
SVGドキュメントを受信する
S1103
SVGドキュメントを分析する
S1104
S1108
オブジェクトをURLにもとづいて取得
NO
S1107
XMLドキュメント or HTMLドキュメント?
YES
S1105
埋め込みオブジェクトあり?
YES
NO
SVGドキュメントをレンダリング印刷
S1106
終了

【図12】


XML、HTML
ドキュメント受信
キャパビリティ要求取得
S1201
XHTMLドキュメントへ
変換(スタイルシート参照)
S1202
XHTML→SVGフォーマット
へ変換
S1203
プリンタへ送信する
S1204
終了